INDUSTRY REPORT

# COMPUTER SERVICES MARKETS IN THE FOOD PROCESSING INDUSTRY

INPUT

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Computer Services Markets
in the Food Processing Industry (1/77)

INDUSTRY REPORT
No. 4

# COMPUTER SERVICES MARKETS IN THE FOOD PROCESSING INDUSTRY

JANUARY 1977

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# COMPUTER SERVICES MARKETS
# IN THE FOOD PROCESSING INDUSTRY

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# COMPUTER SERVICES MARKETS
# IN THE FOOD PROCESSING INDUSTRY

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# I. INTRODUCTION

INPUT

# I INTRODUCTION

- This report is produced by INPUT as part of the Market Analysis Service (MAS).

- Research carried out for this report was done through a series of telephone interviews and contacts as specified in Exhibit I-1.

- Preliminary research was carried out during November and December of 1976; most interviews were completed in December 1976.

- Prior to the research activity, clients were asked to suggest particular questions and specific areas of interest to be incorporated into the study.

- Inquiries and comments on the information presented in the report are requested from clients.

EXHIBIT I-1

## COMPANY INTERVIEW PROGRAM

## BY COMPANY SIZE

| COMPANY SIZE | NO. OF COMPANIES (1976) | SAMPLE SIZE | COVERAGE % |
|---|---|---|---|
| Very Large | 38 | 9 | 24 |
| Large | 48 | 14 | 29 |
| Medium | 600 | 24 | 4 |
| Small | 24,000 | 3 | .01 |

## EXHIBIT I-2

## COMPANY INTERVIEW SUMMARY

| | SAMPLE | INDUSTRY |
|---|---|---|
| Number of Companies | 50 | 25,000 |
| Total Sales ($ Billion) | $31 | $192 |
| % Industry Sales | 16% | 100% |
| Total EDP Expenditures ($ Million) | $92 | $553 |
| EDP Budget % Sales | .3% | .29% |
| Standard Deviation | .17% | |
| EDP ServicesExpenditures ($ Million) | $3 | $20 |
| Average Services (% EDP Budget) | 3% | 3.6% |
| Median Services(% EDP Budget) | 5% | |
| Standard Deviation | 14% | |
| EDP Expenditures/Employee | $206 | |
| Standard Deviation | $126 | |

EXHIBIT I-3

## COMPANY INTERVIEW PROGRAM
## BY INDUSTRY SECTOR

| INDUSTRY SECTOR | NUMBER OF INTERVIEWS |
|---|---|
| Meat | 9 |
| Dairy | 7 |
| Canned and Frozen | 9 |
| Grains | 6 |
| Bakers | 5 |
| Sugar and Candy | 3 |
| Beverages | 9 |
| Miscellaneous | 2 |
| TOTAL | 50 |

# II. MANAGEMENT SUMMARY

## II MANAGEMENT SUMMARY

- The computer services market in the Food Processing Industry will grow from $20 million in 1976 to $38 million in 1981, a 14% AAGR.

- This market is a significant opportunity for 4 to 6 major services companies who can obtain revenues from $2 to $5 million each in 1981.

- Other major services companies who are not dedicated to this market will still obtain a portion of the $23 million available to the major services companies.

- From 6 to 10 small specialty companies will split $10 million in revenues.

- Mainframe manufacturers will account for the remaining $5 million.

- The keys to penetrating this market are:
    - Communications network availability
    - Industry-specific applications knowledge
    - Hard selling to top management

- No major services companies have focused on the market as an integrated opportunity, and none of the independents offer a significant barrier to penetration.

## A. INDUSTRY STRUCTURE

- The Food Processing Industry will grow from $192 billion in 1976 to $306 billion in 1981. The top eleven food companies, whose sales are primarily derived from the food industry, generate $34 billion in sales, 18% of the industry revenues. The largest company, Kraftco, with $5 billion in sales is primarily in the dairy industry. At the bottom end of the scale are 24,000 companies with total sales of $54 billion, 28% of the total.

- The Food Processing Industry can be further subdivided into 9 major sectors. (Exhibit 3.2) Despite the wide differences in the business content of each sector, there is no significant difference in their EDP usage.

## B. EDP AND COMPUTER SERVICES EXPENDITURES

- The use of EDP by food processors lags significantly behind that of other manufacturing industries. The average food company spends only .3% of its sales on EDP, less than 1/3 of that of most other manufacturers. EDP expenditures will grow to .4% in 1981.

- The total amount of money spent on EDP by the food companies will grow at an 18% annual rate from $550 million in 1976 to $1.3 billion in 1981. The majority of the expenditures will be on basic cross-industry applications such as payroll, general ledger, accounts receivable, accounts payable, etc.

- Computer services expenditures in the food industry will grow at an annual rate of 14% from $20 million in 1976 to $38 million in 1981 (Exhibit 2.1) but will lose a share of the users' EDP budget, shrinking from 3.6% to 2.9% of the users' EDP budget in 1976 to 2.9% in 1981.

- The primary impetus to the growth of computer services revenues will be by providing services to:
    - relatively few companies, with over $150 million in sales, who are catching up with the rest of the industry.
    - industry-specialized remote processing services to food processors with sales in the $50-$150 million range whose small in-house staffs are commensurate with their medium-sized computer systems, typically an IBM 360/135.

## C. COMPUTER SERVICES MARKET

- The computer services market can be analyzed by mode of service or by type of vendor. Three modes of service - remote computing services, batch processing services, and facilities management - make up the processing services market. This market can also be analyzed by type of service: general business, scientific, specialty applications, and utilities.

### 1. MODE OF SERVICE

- Remote computing services is the largest segment, 68% of the $38 million 1981 market. (Exhibit 2.2) This growth will be fueled primarily by order entry applications. This is followed in size by software and batch

## EXHIBIT II-1

## COMPUTER SERVICES MARKET

## FOOD PROCESSING INDUSTRY

## ($ MILLION)

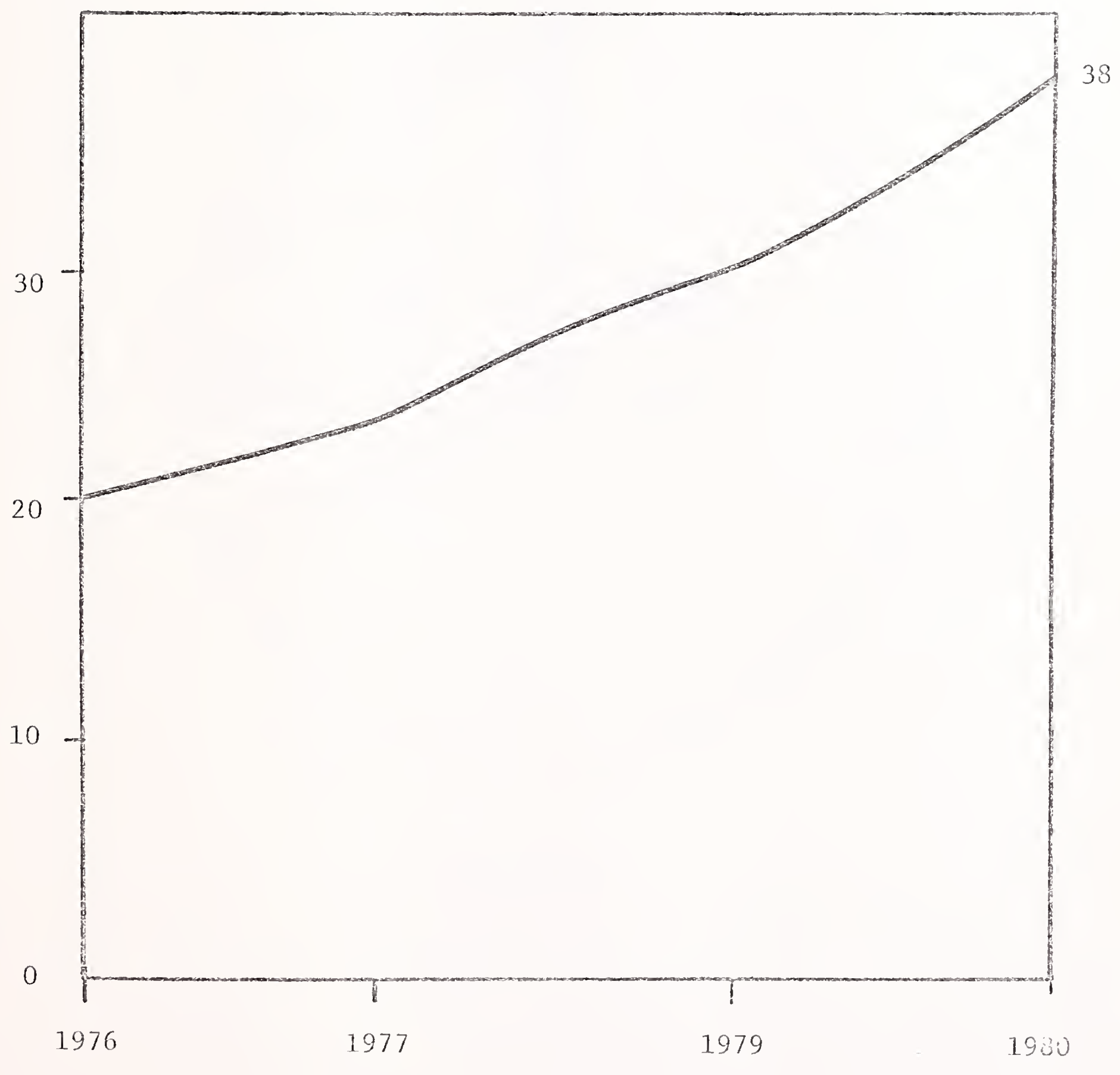
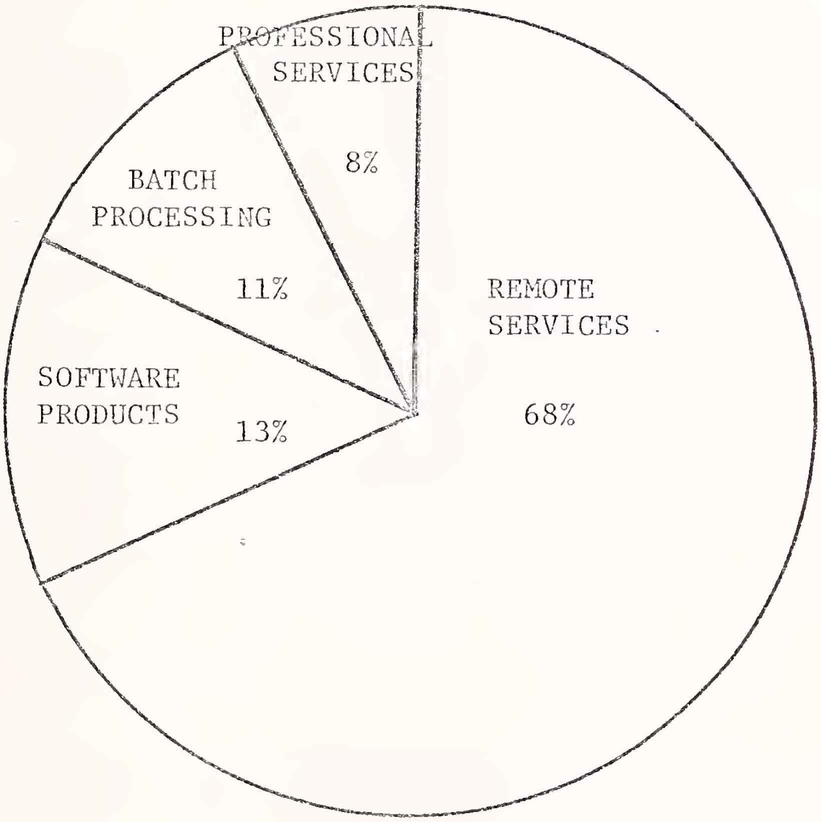


EXHIBIT II-2

## FOOD PROCESSING
## COMPUTER SERVICES MARKET
## BY MODE OF SERVICE
## 1981



$38 MILLION

service bureaus with nearly equal market shares. Facilities management is a negligible opportunity with a projected market of zero.

## 2. TYPE OF SERVICE

- A key to market penetration will be the selection of a specific industry application as an entry point. Two similar specialty applications, order entry and route accounting, are the largest opportunities with sales of $13 million, 43% of the 1981 processing services market. (Exhibit 2.3) This will be followed in size by general business applications, which will grow from $6 million in 1976 to $8 million, 27% of the 1981 processing services market. The growth of these applications will be concentrated in remote batch offerings to the divisions of larger companies and service bureau offerings to smaller companies.

## 3. TYPE OF VENDOR

- The largest market segment will be controlled by major services companies, $23 million in 1981 sales, 61% of the market. (Exhibit 2.4) Major services companies will obtain this position by attacking specific applications and using the established beachhead to obtain greater penetration of other applications within the target companies.

- Vendors specializing in the Food Processing Industry (usually one application) will be small, with fewer than a dozen employees, and will have 26% of the market.

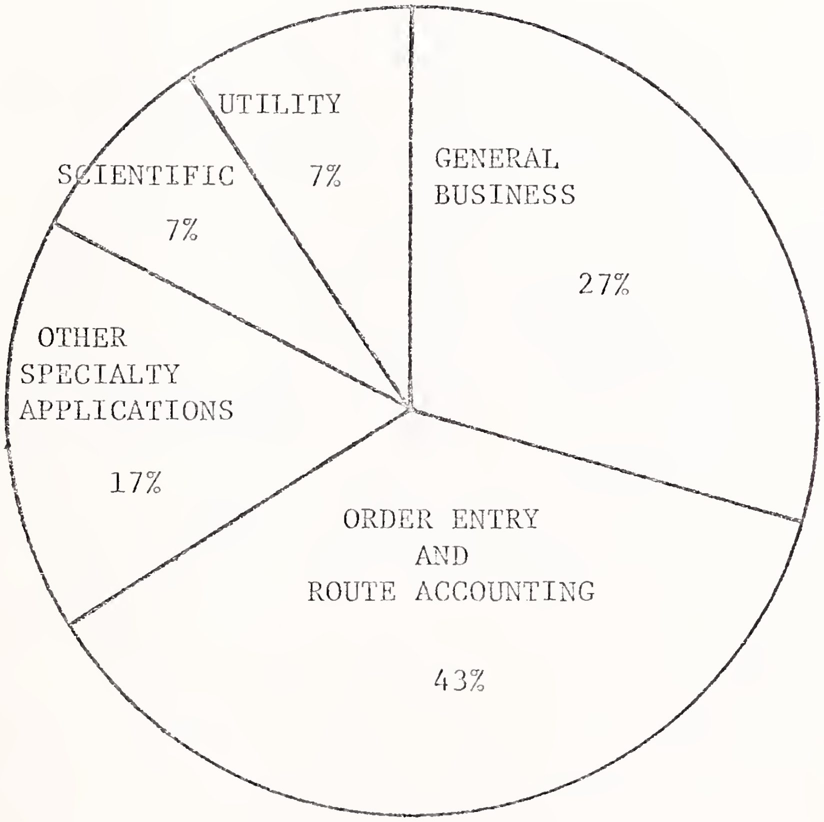
EXHIBIT II-3

FOOD PROCESSING

PROCESSING SERVICES MARKET

BY TYPE OF SERVICE

1981



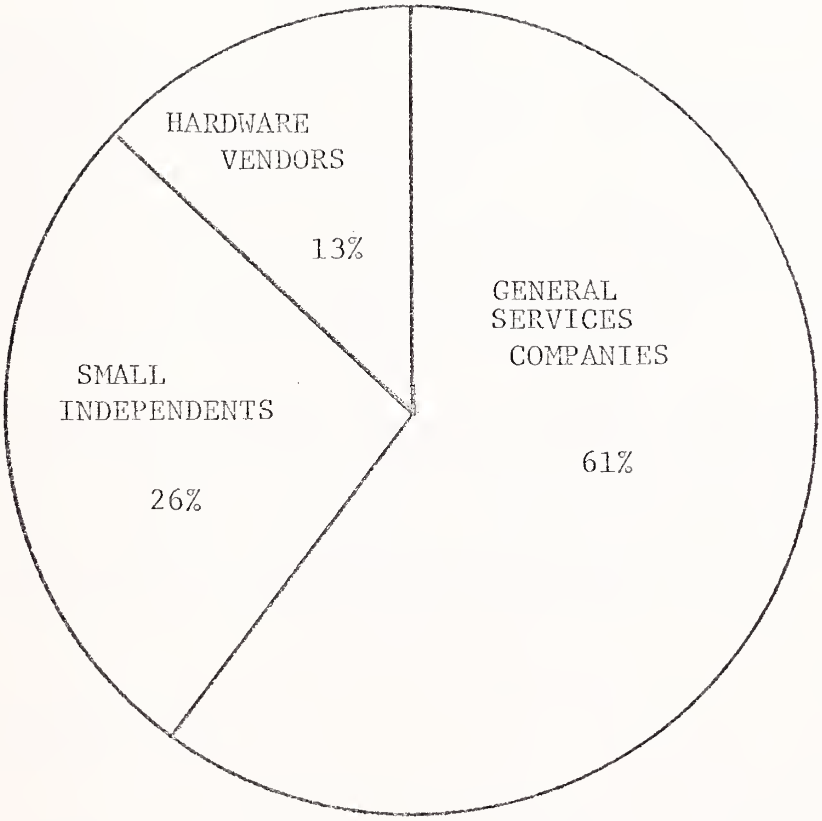
$30 MILLION

EXHIBIT II-4

## FOOD PROCESSING

## COMPUTER SERVICES MARKET

## BY TYPE OF VENDOR
## 1981



$ 38 MILLION

- Mainframe vendors will have a less significant share of the market, 13% primarily from their standard unbundled system software. No specific Food Processing Industry push is expected.

## D. WHY SERVICES ARE USED

- Interviewed companies were almost unaninous in their view that services companies were primarily a convenience, used because of lack of in-house systems and programming capability or sufficient hardware to support an application. Most food companies were planning to bring as much as possible of their service expenditures in-house.

- A major point for most companies was the belief that they could not afford their own data networks and should therefore rely on a services vendor to supply the network and corresponding applications.

## E. MARKETING STRATEGY

- The food processing companies can be characterized by their extreme cost-consciousness or, one might say, stinginess. They view EDP as a necessary expense and not as a possible potential cost saving. Their thinking is not geared to long-range planning or investment for long-term future returns. Salesmen must demonstrate immediate tangible returns.

- Many EDP managers are discouraged with the support they receive from top management and would welcome any help in expanding their function.

- As most companies have general business applications installed, even if in a rudimentory fashion, the major entry strategy must be to develop specialty applications. Joint development efforts will be quite rewarding in terms of spreading costs and getting the customer's commitment.

- This is an underdeveloped market. The business is there for those willing to invest the time and money to get it.

# III. INDUSTRY STRUCTURE

# III INDUSTRY STRUCTURE

## A. SIZE IS LARGE

- Food processing is the most vital of all industries, not only because eating is necessary for life, but also because food processing is the largest of the manufacturing industries, 20% of the total, and employs 1.6 million people. The total value of sales for all sectors of the Food Processing Industry (SIC code 20) will be almost $200 billion in 1976, growing at an 8% annual rate in current dollars to over $300 billion by 1981. (Exhibit 3.1)

## B. GROWTH IS SLOW

- Because it is basic, the food industry is relatively stable and will continue to grow slowly. Its growth will be dependent upon two factors: rate of population increase and increase in per capita food consumption. Neither of these factors encourages rapid growth. As the total food industry (farming, processing, and distribution) has grown more efficient, the relative amount of money the consumer spends on food has declined. It reached a low point of 15% of disposable income in 1972. With the advent of inflation, it climbed slightly to 17.5% in 1976 but will decline again to the 15% range by 1981. Population growth has also slowed to a near zero growth rate.

## EXHIBIT III-1

## FOOD PROCESSING INDUSTRY GROWTH

| | 1967 | 1972 | 1976 | 1981 |
|---|---|---|---|---|
| Value of sales current dollars ($ billion) | 84 | 115 | 192 | 306 |
| Value of sales current dollars ($ billion) | 84 | 95 | 91 | 109 |
| Wholesale food price index | 100 | 121 | 211 | 280 |

- When measured in constant dollars, industry output declined nearly 4%, from $95 to $91 million, during the 1972-1976 inflationary cycle. The long-term constant dollar growth of the Food Processing Industry is very low--only 1%-2% per year. Exhibit 3.1 shows the value of the Food Processing Industry shipments deflated by the wholesale food price index.

- A part of this lack in growth is due to the fact that during the recession the consumer switched from processed to raw food and did his own processing. In order to maintain its position within the total food industry, the Food Processing Industry must rapidly improve both its products and efficiency to keep prices low.

- Other major factors, primarily governmental, influencing the growth of the Food Processing Industry are:
  - Governmental
    - Nutritional labeling
    - Health and safety legislation
    - Manufacturing standards and legislation
    - Air and water pollution standards
    - Commodity market regulations
  - Non-Governmental
    - Weather factors which vary crop yields
    - Expanding implementation of the Universal Product Code
    - Worldwide supply and demand factors

## C. STRUCTURE BY SECTORS

- The Food Processing Industry is subdivided into 9 major sectors. (See Exhibit 3.2) Meat processing is four times the size of the smallest sector. Further analysis at the 4 digit SIC code level shows that the 10 largest (Exhibit 3.3) of the 45 sectors account for 59% of the industry sales. The major sectors are:

  - Meat Packing
  - Fluid Milk
  - Prepared Feed
  - Bread

- Besides products, there are major structural differences between each of the sectors. The butcher, the baker and the candlestick maker have little in common outside of nursery rhymes.

  - Average sales per company range from $4.5 million in the miscellaneous sector to $21 million for the Oils and Fat sectors.
  - Sales per employee range from $60,000 in Baking to $300,000 in Oils and Fats.
  - Value-added ranges from 15% for Meat Packing to 60% for Bakers.

## D. INDUSTRY STRUCTURE BY COMPANY SIZE IS CONCENTRATED

- The industry is dominated by large companies who are primarily in Food Processing. The 11 largest food companies who concentrate primarily on the Food Industry (Exhibit 3.4 ) have 18% of the industry sales. Although

EXHIBIT III-2

## FOOD PROCESSING SECTORS

| SIC CODE | DESCRIPTION | 1976 SALES ($ BILLION) | NO. OF ESTABLISHMENTS | AVERAGE SALES/ESTABLISHMENT ($ MILLION) | SALES PER EMPLOYEE ($ THOUSAND) | % VALUE-ADDED |
|---|---|---|---|---|---|---|
| 201 | Meat | $ 47.6 | 3,000 | $ 15.9 | $ 175 | 15% |
| 202 | Dairy | 22.4 | 4,000 | 5.6 | 150 | 25 |
| 203 | Canned & Frozen | 16.8 | 2,300 | 7.3 | 85 | 40 |
| 204 | Grains & Feed | 25.6 | 2,700 | 9.5 | 190 | 30 |
| 205 | Bakers | 15.0 | 3,200 | 4.7 | 60 | 60 |
| 206 | Sugar & Candy | 12.6 | 1,100 | 11.5 | 100 | 40 |
| 207 | Oils & Fats | 16.8 | 800 | 21.0 | 300 | 20 |
| 208 | Beverages | 19.7 | 3,200 | 6.2 | 100 | 50 |
| 209 | Miscellaneous | 16.1 | 3,600 | 4.5 | 100 | 40 |
| TOTAL FOOD | | $193 | 24,700 | 7.8 | $125 | 30% |
| TOTAL ALL MANUFACTURING | | $950 | 330,000 | 2.9 | $ 45 | 45% |

EXHIBIT III-3

## FOOD PROCESSING'S LARGEST SECTORS

(By Size)

| SIC CODE | DESCRIPTION | 1976 SALES ($ BILLION) | % TOTAL INDUSTRY |
|---|---|---|---|
| 2011 | Meat Packing | $ 35.5 | 18% |
| 2026 | Fluid Milk | 13.1 | 7 |
| 2048 | Prepared Feed | 11.5 | 6 |
| 2051 | Bread, Except Cookies | 10.1 | 5 |
| 2075 | Soybean Oils | 8.7 | 5 |
| 2086 | Soft Drinks | 8.0 | 4 |
| 2099 | Food N.E.C. | 7.1 | 4 |
| 2082 | Malt Beverages (Beer) | 6.2 | 3 |
| 2037 | Frozen Fruits | 6.0 | 3 |
| 2033 | Canned Fruit | 5.7 | 3 |
| SUB TOTAL | | $111.9 | 58% |
| ALL FOOD | | $192.6 | 100% |

EXHIBIT III-4

## LARGEST FOOD PROCESSING COMPANIES

| NAME | PRIMARY INDUSTRY SECTOR | APPROX. 1976 SALES ($ BILLION) | NO. OF EMPLOYEES (THOUSAND) |
|---|---|---|---|
| Kraftco | Dairy | 5.0 | 50 |
| Beatrice | Dairy | 4.0 | 65 |
| General Food | Grains | 4.0 | 50 |
| Borden | Dairy | 3.5 | 40 |
| CPC International | Grains | 3.0 | 40 |
| Ralston Purina | Grains | 3.0 | 55 |
| Consolidated Foods | Canned and Frozen | 2.5 | 80 |
| Pepsico | Beverages | 2.5 | 50 |
| General Mills | Grains | 2.5 | 50 |
| United Brands | Meat | 2.0 | 50 |
| Carnation | Dairy | 2.0 | 22 |

many conglomerates have food processing divisions, they are not a dominant part of the industry. (See Exhibit 3.5 ) The top 5 have less than 9% of industry sales.

- The top 38 food processing companies (Exhibit 3.6 ) have 44% of the industry's sales while the bottom 24,000 mom and pop type establishments have 28% of the market. Because of the relatively low profits and the economics of scale achieved by the larger companies, the number of companies in the industry is slowly decreasing, at the rate of 8% every 5 years.

## E. GEOGRAPHIC DISTRIBUTION IS DIVERSE

- Because distribution is a major cost, the food industry is widely dispersed with sales offices and warehouses close to markets and their distribution approximating the national population distribution. To reduce the cost of transporting raw materials, processing plants are near farms. Major corporation headquarters tend to cluster in the New York, Chicago, and Minneapolis areas. Only 10 of the top 50 corporations have their headquarters west of the Mississippi. Even relatively small companies have sales offices or brokers located throughout the country.

## F. SPECIAL INDUSTRY CHARACTERISTICS

### 1. VALUE-ADDED AND PROFITS ARE LOW

- The Food Processing Industry is characterized by relatively low profits in the 2%-5% of sales range, or about one-half the amount for other manufacturers. Similarly, sales per employee of $125,000 are almost

## EXHIBIT III-5

### MAJOR CONGLOMERATES WITH SUBSTANTIAL FOOD INDUSTRY SALES

| COMPANY | APPROXIMATE COMPANY 1976 SALES ($ BILLION) | 1976 FOOD SALES ($ BILLION) | MAJOR FOOD DIVISION | SECTOR |
|---|---|---|---|---|
| Esmark | $ 5 | $ 4 | Swift | Meat |
| LTV | 4 | 2 | Wilson | Meat |
| Greyhound | 4 | 2 | Armour | Meat |
| Norton Simon | 2 | 1 | Hunts | Canned |
| RCA | 5 | Less 1 | Banquet Foods | Canned |
| ITT | 12 | 2 | Continental Baking | Bakers |
| Nestle-Alimentair | 6 (interactive) | 6 | Libby McNeil (U.S.) | Canned |
| Standard Brands | 2 | 2 | Fleischmann Planters | Misc. |
| American Brand | 4 | Less 1 | Beam Distillery | Beverage |
| General Tire | 2 | Less 1 | Pepsicola Bottling | Beverage |
| Foremost McKesson | 2 | Less 1 | Foremost | Dairy |
| Unilever | 5 | Less 1 | T.J. Lipton | Misc. |
| W. R. Grace | 4 | Less 1 | Various | Canned |

EXHIBIT III-6

## INDUSTRY STRUCTURE

| | | 1976 | | 1981 | |
|---|---|---|---|---|---|
| SIZE | DEFINITION ($ SALES) | # FIRMS | SALES ($ BILLION) | # FIRMS | SALES ($ BILLION) |
| Very Large | $ > 1 billion | 38 | $ 85 | 50 | $140 |
| Large | 300 million-1 billion | 48 | 23 | 55 | 35 |
| Medium | 30-300 million | 600 | 30 | 700 | 45 |
| Small | < 30 million | 24,000 | 54 | 22,000 | 86 |
| TOTAL | | 24,686 | $192 | 22,805 | $306 |

three times the manufacturing average of $45,000 and the value-added of 30% is one-third lower than the manufacturing average of 45%. All of these factors are manifestations of the same phenomenon, the extreme cost-consciousness of the industry. (See Exhibit 3.2)

## 2. RAW MATERIALS

- The cost and control of raw materials is a major factor in determining profits, particularly in Meat, Dairy and Oils. Raw material prices can vary widely during the long lead times, at least one and often two years, between purchase (e.g., breeding of cattle) and receipt of goods (e.g., slaughter). During this time, between decision and action, the price of the raw material can easily double or halve. The food processors try to minimize this fluctuation by hedging in the commodity markets and by entering into purchase agreements with farmers and growers. For a segmentation of the food dollar see Exhibit 3.7.

## 3. GOVERNMENT REGULATION

- Outside influences such as government policies can strongly and drastically influence the food market. Some of the significant government policy areas are:
  - government farm subsidies and price supports
  - raw material sales to foreign governments
  - air and water pollution standards
  - manufacturing standards and control of additives
  - packaging constraints, i.e., sizes, returnable/non-returnable bottles.

## EXHIBIT III-7

| THE FOOD CHAIN | SEGMENTATION OF THE FOOD DOLLAR (%) |
|---|---|
| FARMING AND AGRICULTURE | 9 |
| MILLING, BULK PACKING<br>TRANSPORTATION, PRE-PROCESSING | 9 |
| BAKING, CUTTING, PROCESSING<br>INDIVIDUAL PACKAGING | 30 |
| MARKETING AND WHOLESALING<br>DISTRIBUTION, DELIVERY | 28 |
| RETAIL MARKET AND DISTRIBUTION | 24 |
| | 100 |

The above segmentation is primarily applicable to bakery products. Milk, cheese, meats, and beer go through similar steps. The costs in the food chain shift according to the value added by each processing step.

## 4. PERISHABILITY AND PERIODICITY CYCLES

- Because food is a perishable product, the food industry works on 2 cycles, basically a one-year cycle for raw materials and a daily cycle for finished goods.

- Industry sectors such as Oils, Grains, Sugar, Canned and Frozen Goods work on a one-year cycle. Raw materials are purchased during the relatively short harvest period, processed, and then marketed during the rest of the year. Meat and Dairy sectors work with a highly perishable product which must be processed and sold in a 24 to 48 hour period.

- Other sectors, such as Bakers, Candy, and Beverages that do not use perishable commodities, are insulated from these problems. They tend to have more uniform sales and distribution patterns.

- The yearly and daily cycles are strongly imbedded and influence the thinking of the manufacturers.

## 5. FOOD BROKERS

- Most food products are sold to the retail store through food brokers. The largest food processors may have a captive sales force, but many of them also use brokers for some products or for low density sales areas. The broker is an independent businessman who runs a sales agency specializing in a particular market segment--frozen, canned, etc. A broker may carry several dozen manufacturers' lines and may employ 50 salesmen to service his geographic territory which is usually limited to a 50 to 100

mile radius. The function of the broker is to meet with the food store buyer, solicit orders, work out promotions, and check store displays and inventory. The broker receives a sales commission which can vary by product. Sales are normally made for delivery from 24 hours to 2 weeks after receipt of the order.

## 6. ROUTE SALESMEN

- Some industry sectors, such as Beverage, Bakers and Dairy, use route salesmen to sell and deliver goods. Although the route man dedicates his activities to a single vendor and is usually compensated on a plan that includes commissions, he is, for practical purposes, an independent businessman. The route man sells to the store, stocks the goods, arranges displays and uses his truck, full of highly perishable goods, as a traveling warehouse. Goods that are loaded in the morning must be sold by evening, or they have lost value.

## 7. WEATHER

- The industry is strongly affected by both national and international weather. Crop shortages or surpluses in other parts of the world affect domestic crop prices. Even short-term weather fluctuations, i.e., too much rain at harvest, can adversely affect a crop and result in dramatic changes in commodity prices and availability.

## 8. CO-OPS AND FRANCHISES/LICENSEES

- The Food Industry is strongly patterned by the interconnection of growers and processors on the production side and by franchise/licensing on the sales side.

- In order to protect their markets and reduce costs, farmers have divided themselves into small groups that have shared equipment and storage facilities and have entered into joint marketing arrangements. Farmers have expected that the cooperatives would become large enough to control and thus protect farmers from short-term market fluctuations. These cooperatives have grown with time, and many are now giant corporations with sales in the hundreds of millions of dollars. Some cooperatives have extended their operations from marketing raw materials to processing so that they may better control their own markets. An example is Arkansas Rice Growers, a half billion dollar operation, the largest employer in the State of Arkansas, or Ocean Spray, which has a near monopoly on the cranberry market.

- Other companies, such as Tropicana, operate as:
  - a typical company working for its own account
  - a co-op
  - a marketing agent

- An arrangement analogous to the cooperative is the "marketing arrangement" between large food processors and their suppliers. The processor executes a long-term purchase agreement with the farmer whereby the processor agrees to purchase the farmer's crops. Most canners and frozen food processors contract for their raw materials in this way.

- To serve local markets, analogous arrangements exist, such as that between Royal and its 300 plus bottlers or Pepsico and its 497 bottlers. Bakers such as Wards or ITT Continental set up many, almost identical, bakeries across the country. In each of these cases, there is a strong bond between the parent and the offspring. This relationship can be exploited by a vendor working with the parent company to develop a system or application common to all offshoots.

# IV. USE OF EDP

INPUT

# IV USE OF EDP

## A. INTRODUCTION

- The use of EDP in the Food Processing Industry is considerably behind that of other industries. Even those food processors considered as leaders by others are often using EDP at a level equal to the middle level of companies in other industries.

- Except for a few companies whose overall management philosophy is decentralization, the tendency is to centralize control of EDP. Most centralized food processors are using RJE or distributed processing systems with minis.

- Food processor management views EDP as an absolute overhead cost and therefore tends to minimize EDP usage. There is little thinking about cost savings or the long-term benefits to be obtained with EDP. However, this is slowly changing and some food companies are beginning to look at the benefits and provide more EDP money.

- Despite the wide diversity of operations among the different segments of the food industry, such as between a candy manufacturer and a beer brewer, the use of EDP is roughly at the same level.

- Companies who take an aggressive marketing posture take that same posture in EDP and are more advanced in their EDP usage. Larger corporations can afford EDP departments large enough to develop specialty applications and they spend more.

- The majority of EDP applications expenditures is for primary applications such as payroll, general ledger, receivables and payables, with secondary applications such as inventory and production control the next most popular. Industry-specialized applications, except for order entry, are last.

- Some examples of EDP expenditures that indicate the state of the art in the industry are:
  - a $1/2 billion company with neglible EDP as of 3 years ago.
  - a $200 million company with only a Univac 1004 installed 5 years ago.
  - a $1/2 billion company that programs only in assembler language and has developed its own communications package.
  - a 370/135 that is running only in 1440 emulation mode with conversion not scheduled until the middle of next year.
  - a $350 million company spending $125,000 per year on EDP.
  - a $50 million company with only an 1130 installed in 1968.

## B. EQUIPMENT - MAINFRAMES

- In general, the use of EDP equipment lags behind that of other industries. One firm was very happy with its IBM 1130, installed in 1968, and felt that it would be good for the three more years of its current

lease. Another company was in the process of upgrading to a used 360/50.

- Outside of the largest 100 or so food processing companies, EDP equipment normally consisted of a single medium-sized CPU, with possibly two or three small satellite CPUs scattered throughout the corporation.

- Most of the installed equipment was IBM, paralleling IBM's market share. However, during one continuous set of five interviews of small companies, all the contacted companies had Burroughs B700s or B1700s installed. Only one other Burroughs user was found among interviewees. The string of Burroughs users was balanced out by a considerably longer run of consecutive interviews of IBM System/3 users.

- The Honeywell computer population is strong, almost twice Honeywell's national market share. Only four Univac installations, with two about to be discontinued, were contacted.

- Several companies responded that they were using order entry input forms that were optically scanned.

## C. COMMUNICATIONS EQUIPMENT

- Most companies with multiple sites either had installed communications equipment or were planning to install such equipment in the next year or two.

- There is little need for interactive applications. Most communications equipment was for RJE applications or polled telex-like terminals.

- The type of communications nets used varied widely. Most communications applications are characterized by wide geographic dispersions of

terminals and relatively low data rates. The majority of interviewees were using Ma Bell dial up systems, usually WATS lines. One company monitors all WATS line usage by having telephone operators log destination and length of call.

- For companies in the $500 million range, three to five WATS lines are sufficient.

- Over 10% of the people with communications who were interviewed felt that communications network design, optimization usage, etc. were beyond their capability and use a services vendor, primarily to obtain access to the vendor's network.

- Several companies were using timesharing services, because they had no in-house timesharing capability. However, they expected to be adding software to their internal systems in order to bring the applications in-house.

## D. APPLICATIONS

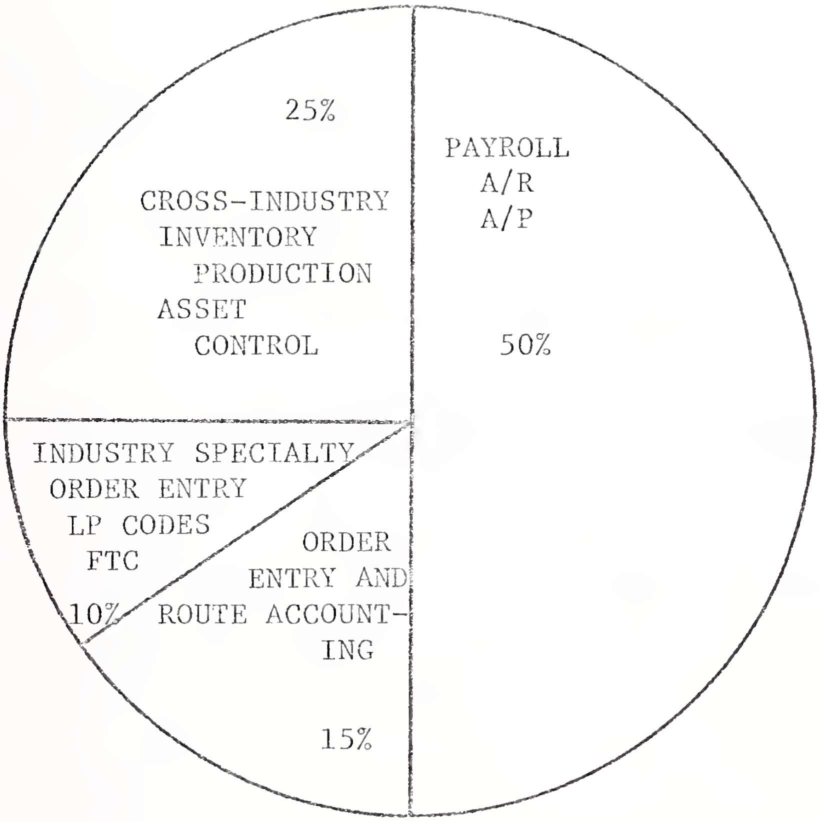
- The industry applications can be divided into three major classes:
  - Basic cross-industry applications
  - Other cross-industry applications
  - Industry-specialized applications

- Half of the industry's EDP expenditures are on the basic applications of payroll, billing, accounts receivable and accounts payable, general ledger and related programs. (See Exhibit 4.1 ) For smaller companies

EXHIBIT IV-1

EDP APPLICATIONS USAGE

1976



$550 MILLION

of $100 million or less, these are usually the only applications installed. The larger the company, the less it spends on the basic applications. (See Exhibit 4.2 ) The largest companies spend less than 40% of their budgets on these applications.

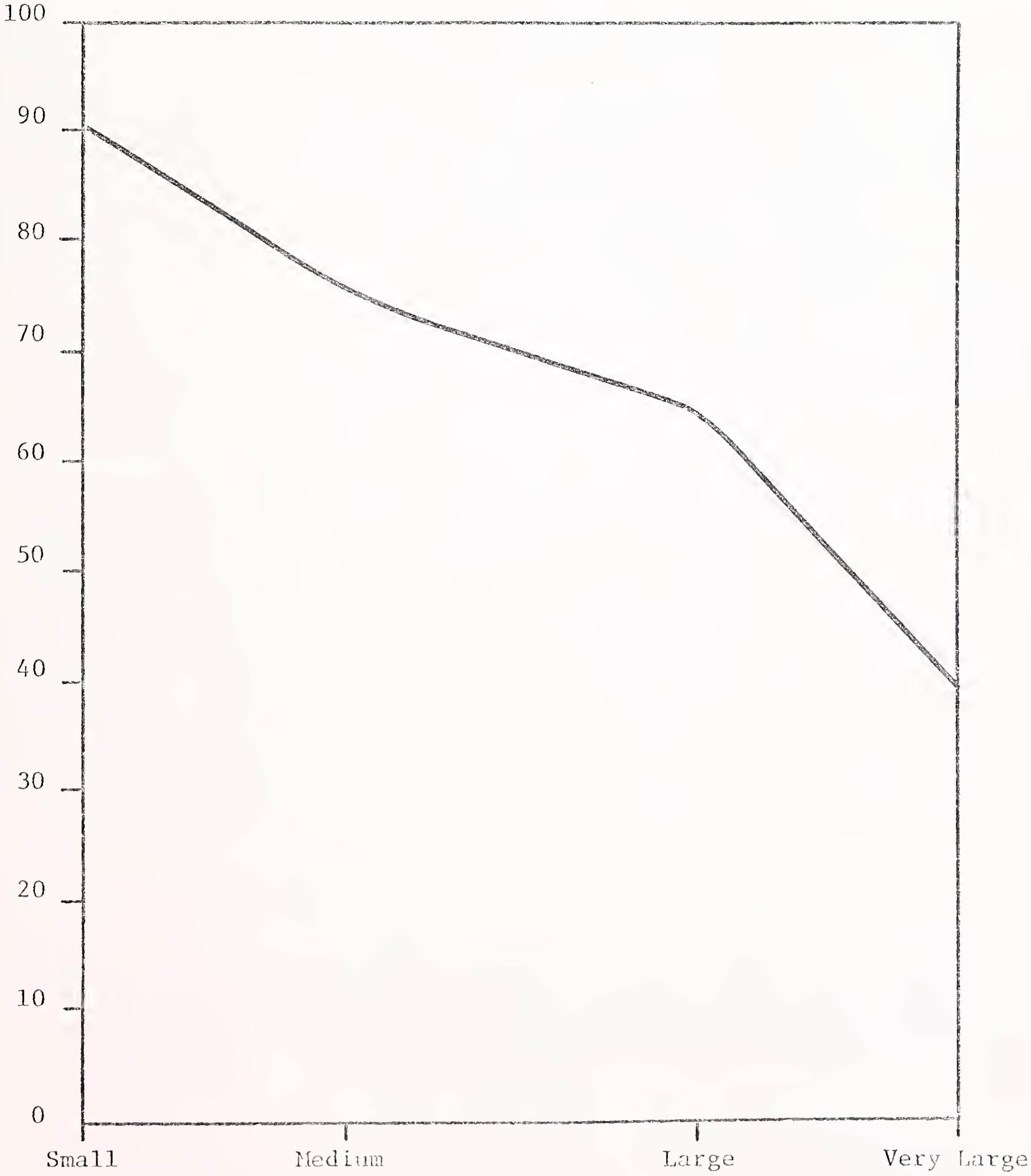
- The MIS manager for one regressive company, an industry exception and a multi-billion dollar corporation, feels that general ledger and accounts payable applications belong on bookkeeping machines. In this company, each division is left to its own devices, with over half the plants having no installed EDP. The Corporate staff uses an outside services bureau to correlate and process the data from almost 500 profit centers.

- The second class of applications, installed in less than half the interviewed companies, is also cross-industry applications and is not specialized in the food industry. These applications, accounting for 75% of industry expenditures include:
    - inventory control
    - sales analysis
    - asset analysis
    - production control

- The third class, accounting for 10% of industry expenditures, includes industry-specialized applications or cross-industry applications that take on special industry nuances. These applications are less frequently installed than second class applications. These applications are discussed more fully in Chapter V.

EXHIBIT IV-2

# PERCENTAGE OF USERS' BUDGET
# SPENT ON PRIMARY
# ADMINISTRATIVE FUNCTIONS
# 1976



USER SIZE

- Order entry is considered both a class two and a class three application, with the difference that, as the latter, it is an on-line realtime application. It accounts for 15% of current EDP expenditures.

## E. DATA PROCESSING CENTERS

- Except for the top 100 or so companies, most food processing companies have only a single CPU installed, or at most, a couple of minis. (See Exhibit 4.3 ) These relatively small systems with their concomitant small staffs make it difficult for most companies to develop applications.

- In the top companies, the overwhelming trend is towards centralization. Only 3 out of the 50 interviewees responded that they were not centralized or had no centralized control.

- Almost all the centralized companies felt that distributed computing, or a variation of it, was the way to go. In most cases, except for possibly the top 50 companies, only smart terminals are needed in the outlying locations. Three companies indicated they had centralized with smart terminals, one with Datapoint 200s and 100s, one with Data 100s, and one with Sycor. The latter company indicated that without the low price of the Sycor, they could not have gone this route.

- Along with the centralization is the concept of bringing services company work in-house, especially for those companies that use service bureaus for processing divisional workloads.

- Only one interviewee expressed an interest in expanding outside services.

EXHIBIT IV-3

EDP EXPENDITURES

| COMPANY SIZE | AVERAGE 1976 SALES ($ MILLION) | AVERAGE ANNUAL EDP EXPENDITURES ($ THOUSAND) | TYPICAL EDP SYSTEM |
|---|---|---|---|
| Very Large | $2,240 | $9,000 | two IBM 370/168 |
| Large | 480 | 1,440 | IBM 370/145 |
| Medium | 50 | 150 | Burroughs 1700 |
| Small | 2.2 | 2,002 | No In-House System |

## F. EDP EXPENDITURES

- The average food processing firm spends .3% of its sales on EDP. This will grow to .4% by 1981. The larger companies spend more, and the smaller companies spend less, with a very rapid falloff for companies below $100 million. (See Exhibits 4.4 , 4.5 ) These EDP expenditures are 1/2 to 1/3 the amount that most other large manufacturing companies spend. (See Exhibit 4.5 )

- The leading-edge companies interviewed, those with the most sophisticated EDP applications, spend only .6% to .7% of their sales on EDP. (See Exhibit 4.6 )

- By 1981, the average large firms' EDP expenditures will be equal to the expenditures of today's leaders, i.e., .6% to .7%. Leading-edge users in food processing are way behind leaders in other industries such as aerospace or petroleum where leaders may spend 2 to 2 1/2% of sales or 3 times as much on EDP.

- One large bakery, a half billion dollar sales operations that was pointed to as a leading-edge example by many companies, spends about .1% on EDP.

- The growth of EDP in the Food Processing Industry follows the standard S-shaped market penetration curve. (Exhibit 4.4 ) The heaviest EDP users, large and very large companies, will saturate their EDP usage with about 1% of sales spent on EDP by the late 1980s. These companies are currently on the high growth rate part of the curve. The speed with which they progress along the curve will to an extent depend upon help

EXHIBIT IV-4

## EDP EXPENDITURES
## BY FOOD PROCESSORS

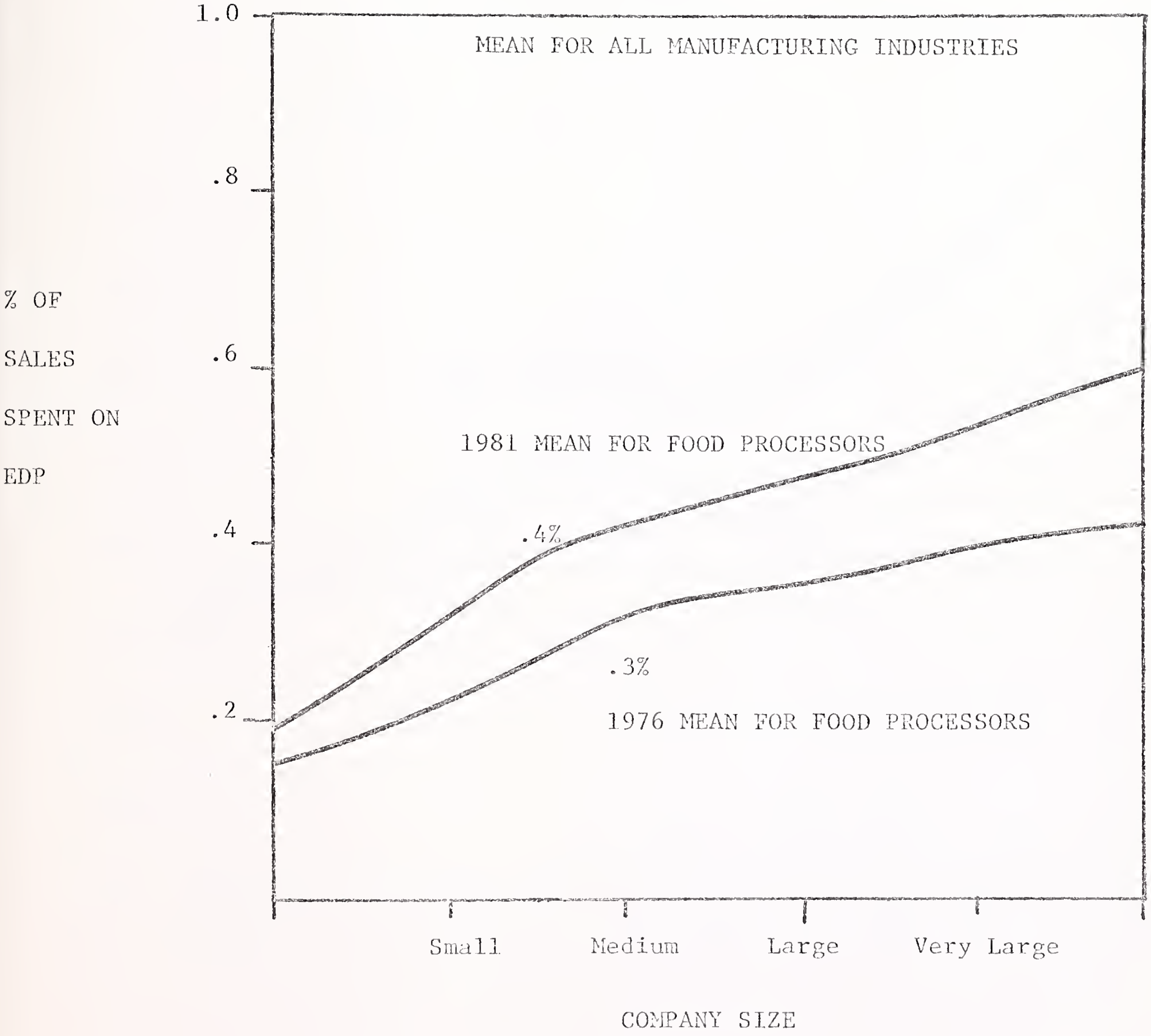


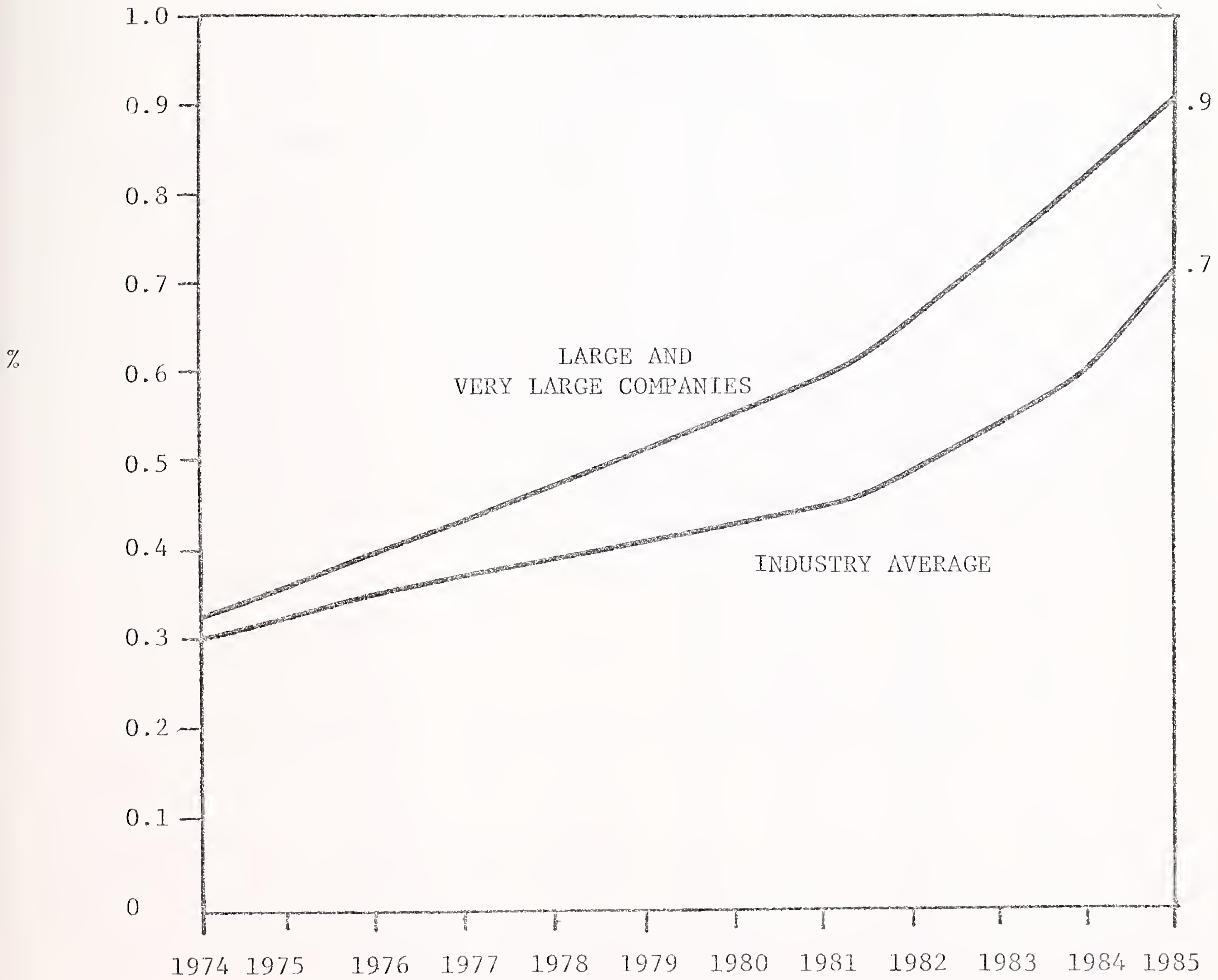
EXHIBIT IV-5

GROWTH OF FOOD PROCESSORS'

EDP EXPENDITURES

1974 - 1985

(% OF SALES)



## EXHIBIT IV-6

### DISTRIBUTION OF EDP EXPENDITURES
### OF INTERVIEWED COMPANIES
### (# OF RESPONSES)

| | COMPANY SIZE | | | |
|---|---|---|---|---|
| % SALES SPENT ON EDP | VERY LARGE | LARGE | MEDIUM | SMALL |
| >.7% | 1 | 1 | | |
| .6 | 1 | 1 | | |
| .5 | | 2 | 2 | 1 |
| .4 | 1 | 2 | 5 | |
| .3 | 1 | 1 | 4 | |
| .2 | 2 | 3 | 5 | 1 |
| .1 | 3 | 3 | 7 | 1 |
| .1 | | 1 | 1 | 1 |
| TOTAL RESPONSES | 9 | 14 | 24 | 4 |
| AVERAGE % EDP | 3% | 3% | .2% | .2% |

from outside services vendors.

- The rest of the food processing companies will follow this lead at a slower rate and peak out with EDP expenditures at about .7% to .8% of sales.

- The average industry EDP expenditure will be held back by the large number of small firms that will have negligible EDP usages.

- The use of EDP appears to be independent of food industry sub-sector, with the possible exception of soft drink bottlers who spend 20-30% more.

- It might be thought that the low EDP expenditures of food processors, which are based on percent of sales, would fall more in line with other industries if based upon another criterion of the company, such as value-added or EDP expenditures/employee. (Exhibit 3.2 ) However, if these alternative criteria were to hold, then the interviews would have disclosed a wide variation of EDP expenditures within each of the food processing sub-sectors. This, however, was not the case.

- Therefore, the primary reasons for low EDP usage in food processing must be due to inherent characteristics of food processing companies and their managers. Some of these characteristics, slightly generalized for emphasis, are:

    - extreme cost consciousness
    - a one-year orientation and outlook on life due to crop cycles
    - lack of long-term planning cycles
    - little concept of capitalizing programming development costs
    - little or no R&D expense.

- An atypical example, but one that is indicative of the state of the EDP art in the industry, is the following. A company with sales of one-half billion dollars had negligible EDP installed two years ago. The company went on a crash joint development effort with a timesharing company to develop a set of basic application programs. Incidentally, the time-sharing company received additional benefit by offering these cross-industry packages to others. The package is now installed and running in a dozen locations, providing an operating base. The company is expanding applications and reducing costs with another joint development effort with the same service company to develop a distributed data system using smart terminals. Each of these developments resulted in a six-figure contract for the service company.

## G. EMPLOYEE TURNOVER HIGH

- Another indication of low EDP usage is the high turnover of EDP managers. At least 1/3 of the EDP managers interviewed had either joined their company in the last 18 months or were planning to leave in the next 18 months. At least 1/2, if not 2/3 of the managers expressed unhappiness with their EDP budgets and top management's low level of EDP support. These managers would be of great help in trying to sell outside services.

# V. APPLICATIONS ANALYSIS

# V APPLICATIONS ANALYSIS

## A. INTRODUCTION

- There are two major classes of applications:
    - Cross-industry applications that are used by almost all industries
    - Industry-specific applications which are of primary interest to the Food Processing Industry.

- The bulk of EDP expenditures, about 75%, are in the first class of applications with less money spent on industry-specific applications. Many of the industry-specific applications are not daily runs, or, if daily, are not large number crunchers. Order entry is an exception. The name implies that it is a cross-industry application, but the nuances definitely make this an industry and even a sub-sector specific application.

- From a functional standpoint, the major industry applications and their percent of EDP usage are:

| | |
|---|---|
| - Purchasing | 12% |
| - Production | 4% |
| - Distribution | 23% |
| - Marketing | 7% |
| - Administrative | 54% |

- Exhibit 5.1 shows the relative distribution of EDP expenditures based on company size. The smaller companies concentrate most of their efforts on administrative processing and related areas, while the larger companies spend relatively more on industry-specific applications.

- Exhibit 5.2 shows the EDP relationship between functional areas and application areas.

## B. PURCHASING

- This includes all those functions related to contracting for, purchasing, transportation of, payment for, and control of raw materials. This function, especially when it is concerned with purchasing from the farmer, is one of the most most profitable payoff areas for EDP usage.

- The precise control of amounts, prices, and locations of raw materials is an extremely fruitful area for EDP. For example, some of the problems are:

  - extremes in price variation caused by rapidly fluctuating commodity market prices
  - widely varying amounts of materials received compared to those expected, because farm yields have been drastically altered by weather changes
  - the perishability of the materials

- The "loss" of a boxcar of raw material in the receiving yard, while the commodity spoils, pays for a lot of EDP.

## EXHIBIT V-1

## 1976 EDP USER BUDGET ANALYSIS

## % IN EACH APPLICATION AREA

| | USER SIZE | | | | AVERAGE |
|---|---|---|---|---|---|
| | Very Large | Large | Medium | Small | |
| Purchasing | 15% | 10% | 5% | 5% | 12% |
| Production | 5 | 2 | 2 | 1 | 4 |
| Distribution | 30 | 20 | 10 | 3 | 23 |
| Marketing | 10 | 3 | 3 | 1 | 7 |
| Administrative | 40 | 65 | 75 | 90 | 54 |
| TOTAL | 100% | 100% | 100% | 100% | 100% |

## EXHIBIT V-2

## MAJOR FOOD INDUSTRY APPLICATIONS

| | CROSS INDUSTRY | INDUSTRY SPECIALIZATION |
|---|---|---|
| PURCHASING | • accounts payable<br>• inbound freight control | • commodity hedging<br>• grower contract management<br>• commingled commodities<br>• quality control |
| PRODUCTION | • production control<br>• quality control | • blending/usage requirements<br>• (LP codes) |
| DISTRIBUTION | • inventory control<br>• transportation/routing | • order entry<br>• route accounting settlement<br>• transportation problems<br>• return/distressed goods analysis |
| MARKETING | • sales analysis | • market research/ position analysis<br>• forecasting |
| ADMININSTRATIVE/ MISCELLANEOUS | • accounts receivable<br>• payroll/personnel systems<br>• general ledger<br>• fixed asset accounting<br>• financial modeling | • company models |

- Government regulations require certain commodities to be paid for within a very short period, such as one day or one week. Meeting these restrictions requires careful control over materials receipts and subsequent payments.

- Purchasing is further complicated by the fact that cooperatives will commingle their purchases, process and sell them. Strict accounting must be maintained to allocate the sales revenue for a particular lot to the farmer who sold the merchandise.

- Because of the wide variation of the incoming material quality, some companies have installed on-line automatic testing systems to weigh and grade incoming goods.

## C. PRODUCTION

- This includes all those activities concerned with the conversion of raw materials to finished goods. This area is virtually untapped for EDP usage. Only a few companies are using any EDP in this application.

- The major EDP production applications, particularly for services companies, have to do with proper allocation of raw materials. Primarily, this is the use of linear programming codes for blending and cutting operations. Because of the tremendous tonnage of raw materials used, savings of a fraction of a penny per pound can justify large EDP expenditures. Almost any food company can justify some EDP usage in this application.

- Process control applications, although numerous in the larger companies, are not analyzed in this report.

## D. DISTRIBUTION

- This includes the functions of storage and transportation to the customer. At one end of the product spectrum are the highly perishable products such as dairy or bakery goods. Precise control of finished goods inventory coupled with sales forecasting and production control is very important. At the other end of the spectrum are canned and frozen food products which are produced during the very short harvest period and which then must be stored for the coming year. Distribution is a major controllable cost which EDP can minimize.

- The major EDP distribution applications are order entry, sales forecasting, and inventory control applications. Portions of these applications may be considered to belong to marketing or administration.

- Order entry is a major application because of the short lead time between order and shipment. Retail food stores keep very little inventory. Goods are ordered for delivery the same week, and most manufacturers guarantee 48-hour delivery. A beverage route saleman brings his truck back at night and places his order to load the truck the next morning. Meat processor customers want fresh merchandise, and goods must be delivered quickly, usually 48 hours after slaughter--a true "kill to order" operation.

- Secondary applications include optimization of distribution paths, warehouse locations, and amounts stored. These are secondary because they do not need to be run often, but their use and understanding could grow naturally from the use of linear programming codes for other applications.

## E. MARKETING

- This involves the collection and reduction of data on product and competitor sales. It requires vast amounts of data collection and reduction. Market penetration data is available from several vendors, and this is supplemented by a company's own salesmen.

- The sales forecasting function is extremely complex because of seasonality and promotions, as well as weather variations. Not too much ice cream is sold on a cold, wet Sunday in July.

## F. ADMINISTRATION

- Administration functions are all the other miscellaneous functions within the corporation. Some of the functions included are payroll and personnel records, fixed asset administration, bookkeeping, accounts receivable and accounts payable.

## G. DETAILED APPLICATIONS - INTRODUCTION

- A detailed description of industry-specific applications follows. The applications are listed in functional order. The cross-industry applications are truly cross-industry, and no further discussion is given other than the listing in Exhibit 5.2.

### 1. PURCHASING - HEDGING

- Commodity prices have violent swings and may change by 50% either

way in less than a month. Both farmers and manufacturers often wish to protect themselves from these short-term fluctuations. The farmer protects his position by selling a futures contract for the month in which he expects to ship his goods. The buyer of the contract is obligated to take delivery of the commodity in the specified month at a specified price. By selling the contracts, the farmer knows what he will be paid for the goods and his resulting profits. Similarly, a manufacturer will buy a futures contract, assuring delivery at a fixed price, and the manufacturing costs will be known.

- The hedging operation includes two distinct applications:
  - record keeping
  - price estimating

- The most common application is record keeping. Many companies will buy or sell commodity contracts based on their current inventory and future requirements regardless of contract price. By buying in advance of his needs, the manufacturer knows his costs. Similarly, by selling a contract whenever he receives goods, the manufacturer locks in his profits. The purpose of the record-keeping application is to keep track of the current commodities contract position, and the theoretical gain and loss on the contract based on the current commodity price, and to notify management when a contract is about to elapse and should be exercised. Several companies had installed this as an on-line application.

- Price estimating involves a mathematical analysis of current and past commodity prices, crop information, weather, demands, etc. to provide a basis for estimating future contract prices. This information is then used to time contract purchase or sales. Implementation of this application

requires a large data base of prices plus real time access to current prices, i.e., commodity market ticker tapes. Although a great deal of theoretical work has been done on this problem, including some in the early 1900s, no one has yet been able to prove the validity of a particular mathematical model, although many people claim they have been helped.

## 2. PURCHASING - GROWER CONTRACT MANAGEMENT

- Many food manufacturers, especially in the canned and frozen goods sector, as well as cooperatives, have purchase contracts with their growers. The variations in these contracts are almost as many as the number of contracts. Basically, the contract calls for the manufacturer to take a minimum amount of the commodity at some minimum price. Variations could include taking a maximum amount or all of a farmer's output. Price variation could include fixed rates, floating rates tied to any one of a number of indexes, or a combination of variable amounts and price. The contract management application program manages these contracts and provides reports on the amounts and quality of goods delivered by each grower and the amounts still owing. The monitoring of payments is also important as many growers will receive advance payments. A farmer who has an unexpectedly high crop yield may have a tendency to deliver more than his contract allows, so over-deliveries must be monitored.

## 3. PURCHASING - COMMINGLED COMMODITIES

- Cooperatives commingle the commodities of various suppliers and vendors into a single homogeneous product, and then the "profits" of

the operation are divided among the owners and suppliers. It is necessary to keep accurate records on the amounts and quality of each input, so that the profits can be divided equitably. In many respects this application is similar to contract management in that detailed records must be maintained for each shipment from each grower. However, this application extends the former application by tracking the product through the sales stage.

### 4. PURCHASING - QUALITY CONTROL

- This application is a partial subset to both grower contract management and commingled commodities. Sophisticated implementation of these two applications will run this subset. The quality control function includes measurement, usually weight, and quality analysis of the incoming shipment. This could also be a process control application.

- One company tried purchasing, contract management and sales forecasting together to predict and control the location, type, and amounts of crops to be planted by its growers. Another company said that its computer was used to analyze costs and output information to destroy crops, as this was cheaper than transporting, processing and storing them.

### 5. PRODUCTION - LINEAR PROGRAMMING

- Some of the particular applications, which are variations of the same basic mathematical techniques, are:
  - feed blending, determining the mix of grains and additives to produce the lowest cost feed of a specified quality. A classic

case of this application is that of the feed that met all requirements but one, that of taste. Chickens would not eat it.

- sausage blending, determining the mix of ingredients to produce a sausage for least cost, i.e., how many of which cuts of beef or pork should be used.
- milk utilization, determining the mix of milk, cream, cheese, ice cream, etc. that will maximize profit.
- butchering, determining the proportions of steaks, hamburgers, etc. that will optimize profits.

- Note that the first two applications optimize multiple inputs of resources to a single output. The last two applications optimize a single input commodity stream into multiple outputs or products.

- In the real world, all companies have multiple inputs and outputs, i.e., a feed blender can make dog, chicken or cow feed. One interviewee spent a great deal of time discussing this aspect of the problem which he called "best output" as opposed to "optimum output." A "best" application requires considerably larger linear programming codes than for an optimized single stream.

- One aggressive $1/2 million, vertically-integrated farmer-manufacturer was planning to run a 1500 row 8,000 column problem to optimize his entire operation. Smaller users' currently-run models take 50 hours of 360/50 time to run.

- The major difficulty in applying this application is the development of the proper front and back ends for the linear programming code to optimize the human interface. Each food sub-sector application requires

specific knowledge of that sub-sector. Despite the mathematical similarity of linear programming for petroleum and food, the petroleum consultants have not penetrated the food industry, and vice versa, because of this industry specialization knowledge.

- Large manufacturers have in-house personnel who can understand and work with the codes but may not have large enough equipment to run the problems economically. Smaller manufacturers do not have the in-house capability. Development of this application potential in the smaller companies requires a great deal of hand holding and carefully controlled man/machine interfaces.

- Although linear programming can be done on almost any type of computer equipment, the largest problems utilize hours of machine time and are best, and most cheaply performed, on the largest computers available.

- Input, saving, and changing of model variables is a tedious job and interactive input of these variable speeds up the processes.

- The solution of a linear programming problem is an iterative process of trying better and better solutions until an optimum solution is found. Often this process can be speeded up by interaction with the operator to determine the next set of variables to be used on the next iteration.

- Once a food processor's people become comfortable working with linear programming, they can be more easily led to the use of the technique for other corporate models such as distribution.

- One company had used LP to predict the impact of the recent sugar

shortage on its operation. The model worked perfectly, but the old-line middle management refused to believe the analysis, and the company suffered severely because the managers did not take the necessary corrective action.

- One company used the output of its linear programming as input for its buyers. This provided the buyers with information on types, quality and amounts of raw products to buy.

- Because Coors cannot produce enough beer to meet demand, it utilizes a production allocation program to allocate the beer to its distributors.

## 6. DISTRIBUTION

- Order entry is the major industry specific function. Approximately 10% of the respondents use service companies for this application, and 20% of the service expenditures of all respondents is spent on this application. The two major types of order entry applications are:
  - order entry - where the primary requirement is message switching
  - route accounting - where sales are made from a truck that travels a specified delivery route.

## 7. ORDER ENTRY - MESSAGE SWITCHING

- The majority of industry sub-sectors, such as meat, canned and frozen foods, grains, sugar and candy, have salesforces composed of captive and independent salesmen called food brokers who are located throughout the country. The salesmen call on retail outlets and chains for orders that are to be delivered the same week or sooner. The orders are forwarded to a central location which collects and forwards the orders to plants

and warehouses for shipment to customers. A broker may sell for many companies.

- Companies with communications based order entry systems poll their brokers once or twice a day to collect the orders. Periodically, once every hour or once every two hours, they send this data to the warehouses. One company polled its larger brokers and salesmen every 30 minutes. Typically the terminals are Telex or the like.

- Several companies found that they had difficulty with salesmen or their secretaries entering data accurately and were ending up with unusable input. Three of the interviewed respondents solved this problem by having salesmen phone orders to centrally-located operators who used on-line CRTs to enter data.

- Much of the input data is repetitive in nature, i.e., a store will tend to order the same number of cases of canned peas this week as it did last week. The number of stock keeping units (SKUs) is also relatively limited for each vendor. Two of the interviewed companies took this factor into account and used optically-scanned input orders.

- The optically-scanned input can be combined with computer printouts to produce a turnaround document. Facsimile transmission, or preformatted CRT screens can be used to produce a more sophisticated and responsive input system.

- In any case, the primary problem is message switching--to take input messages from a salesman broker and distribute these messages to the ware-

houses. The form and content of the message is changed very little.

## 8. ROUTE-ACCOUNTING

- Route-accounting is a major application for the following industry sectors which account for 30% of all food manufacturing:
  - Dairy
  - Bakers
  - Beverages

- In these industries, the major mode of distribution is by a route salesman, who drives a truck to each retail outlet, removes stale merchandise, replaces it with fresh, and takes new orders. From a data processing standpoint, it is an order entry application, except that the warehouse is a moving truck. At the end of each day, the merchandise returned in the truck must be tallied and balanced with what was shipped in the morning and what was billed to customers. A printed short-list, or reconciliation of the differences, is part of the application. The next day's orders are printed out at the loading dock for truck loading, scheduling, and routing.

- Each sector is different and required different packages. For example, beverage companies do not have the variety of merchandise or returned merchandise problems of a bakery.

- The route-accounting application is further divided into two completely different subsets which require separate programs. A company may require one or both packages for a single delivery truck.

- Distribution processing requires the handling of advance orders. The customer orders goods in advance, typically a week. Truck scheduling and route travel minimization are covered in the more advanced installations of this application. Typical system characteristics are shown in Exhibit 5.3 .

- Route settlement requires the processing of daily orders taken for delivery the next time the truck stops, usually the next day. The system processes all sales, invoices, and reconciles the goods returned and the cash receipts. The system also keeps tally on how much of the route has been covered. A single route may take one to two weeks to cover. Typical system characteristics are shown in Exhibit 5.4.

- Route-accounting is also performed for vending machine routes such as in wholesale operations and manufacturing. The major emphasis in this application is on cash sales reconciliation.

- Route-accounting is also used by many wholesale firms both inside and outside the food industry. Several companies, including Automatic Data Processing, have programs tailored to wine and liquor wholesalers.

- Route-accounting is an ideally-distributed processing application for a geographically-dispersed company. Small remote intelligent terminals can process the workload from 50 to 100 trucks, do the daily data processing, and send summary information back to the headquarters locations. Several manufacturers who were interviewed have installed the application on this basis. One baker said that he went to a distributed processing system,

EXHIBIT V-3

## DISTRIBUTION PROCESSING

FEATURES

- Master dealer data base file with routing, delivery service frequency and historical sales data
- Pre-printed advance orders with historical summary
- Pre-printed invoices and load summaries
- Multiple pricing options
- Provides for pricing future discounts and promotions
- Automatic tax computation
- Automatic billing of cooling charges or rented equipment
- Multiple advance orders can be entered and stored without rekeying
- Prints invoices in delivery sequence

EXHIBIT V-3
(cont'd.)

## DISTRIBUTION PROCESSING

MAJOR REPORTS

- Dealer master file
    - by customer #
    - by route
    - selected dealers
    - alphabetic
- Product master file
- Advance orders form
- Load reports
- List of missing advance orders for a route

## EXHIBIT V-4

## ROUTE SETTLEMENT

FEATURES

- Only exception invoices entered
- Checks invoices for taxes
- Checks invoices for proper prices, discounts and promotions
- Common calculations
- Over/short calculations and running account
- Analysis of planned versus actual calls

EXHIBIT V-4
(cont'd.)

ROUTE SETTLEMENT

MAJOR REPORTS

- Over/short list by routeman
- Loads versus sales settments by route
- For each route
    - over/short list
    - load versus sales
    - settlement reconciliation
    - cash reconciliation
- invoices
    - invoice register
    - selective analysis
- interfaces to other systems
    - general ledger
    - accounts receivable
- Commission, sales, over/short summary
- Control totals

since he could not be at the mercy of a central computer breakdown.

- In route-accounting, payoff can be quite high. One company stated that its yearly accounting costs for a route dropped from $670 to $350 with the computerized application.

## 9. RETURNS/DISTRESSED GOODS ANALYSIS

- A subset of the route settlement application, but one that has broader applicability, is returned goods analysis. Many food companies are required to stamp their goods with last date-of-sale information. The returned goods must be analyzed and accounted for.

## 10. TRANSPORTATION

- Warehousing and storage is a major area of concern for those companies that store a year's supply of goods. Local material storage to meet the 24 and 48 hour delivery time is critical. There can not be any back orders, as these become lost sales. The optimization of the storage and distribution network can have significant economic impact but is not a frequently run application.

## 11. MISCELLANEOUS

- One company was using the G.E. timesharing service because of the availability of a containerizing and palletizing program.

## H. MARKETING

### 1. MARKET RESEARCH

- A major problem confronting all package goods manufacturers is the determination of market share and market position. The continual flow of new products coupled with a success ratio of less than 10% means that the monitoring of new product sales to determine if an item is a winner or loser is very important.

- Many companies use commercially available services such as A.C. Nielson's market monitoring service and couple this with data from their own salesmen to determine market share. The application requires a tremendous amount of data input. It is typically run monthly or quarterly.

### 2. SALES FORECASTING

- Sales forecasting is a complex problem which most companies either do manually or if they do it on EDP, they are not completely happy with the results. The complexity of the problem seems to be beyond solving, especially with the current resources applied to program development. The proverbial little old man with the green eyeshade, perched on his stool in front of a roll-top desk, with 40 years of experience behind him, produces a sufficiently reliable forecast for most companies.

- Some of the factors involved in obtaining a forecast are:
  - source and availability of raw materials
  - price

- seasonality

- promotions

- customer tradeoffs with functionally-equivalent items, i.e., chicken, not steak.

# VI. COMPUTER SERVICES MARKETS

# VI COMPUTER SERVICES MARKET

- Computer services expenditures by food processors will grow at a 14% annual rate between 1976's $20 million in expenditures to 1981's $38 million in expenditures.

- The major modes of computer services offerings and their growth are shown in Exhibit 6.1. These are:
  - Remote Computing services
  - Batch Processing
  - Facilities Management
  - Professional Services
  - Software Products

- The major types of processing services are discussed in more detail later.

- Remote computing services is the largest segment with $26 million, or 68% of the 1981 total. (See Exhibit 6.1) The other modes of service are less than half of remote computing services and will grow at 1/3 the rate.

- The major factor influencing computer services market growth will be the rate of sales effort by services companies. With relatively few exceptions, food processors are not forward looking with respect to a direct expense item such as EDP. They are concerned with cutting cost. It will

EXHIBIT VI-1

## COMPUTER SERVICES EXPENDITURES IN FOOD MANUFACTURING

## 1976-1981

## BY MAJOR SERVICE MODE

| COMPUTER SERVICES CATEGORY | EXPENDITURES ($ MILLION) | | AVERAGE ANNUAL GROWTH RATE |
|---|---|---|---|
| | 1976 | 1981 | |
| Remote Computing Services | | | |
| • Interactive | $ 2 | $ 4 | 15% |
| • Remote Batch | 8.5 | 21 | 20 |
| • Data Base | 0.5 | 1 | 15 |
| SUB TOTAL | 11 | 26 | 19 |
| Batch Processing | 4 | 4 | 0 |
| Facilities Management | 0 | 0 | 0 |
| Professional Services | 2 | 3 | 8 |
| Software Products | | | |
| • SystemsPackages | 2 | 3 | 8 |
| • Applications Packages | 1 | 2 | 15 |
| SUB TOTAL | 3 | 5 | 11 |
| TOTAL | $20 | $38 | 14% |

take hard selling on the part of vendors to cause companies to incur additional expenditures for overhead items such as services.

- Less than 20% of food manufacturers see their EDP budget growing at a rate faster than that of their corporation.

- None of the interviewees expressed overwhelming enthusiasm for the need for a computer services vendor. Most were happy with their experience but felt that they had used the services company because of necessity. If they had had a choice, they would have preferred to do it in-house. Several companies were taking aggressive steps to bring the necessary resources in-house and to reduce their dependence on services companies.

## A. LARGE FIRMS WILL SPEND MORE

- The largest firms, because of their size and bulk, will be the largest market for computing services. (See Exhibit 6.2 ) Their services expenditures will increase from $10 million in 1976 to $17 million in 1981, an 11% annual growth rate. The $7 million increase will arise primarily due to an increase in spending by a few firms rather than an across-the-board increase by all firms. The smallest food processors will have an increase in services expenditures from $3 million in 1976 to $5 million in 1981, also an 11% annual growth rate. Large and medium-sized firms will each have an 18% annual growth rate.

- Exhibit 6.3 analyzes the market further, showing the mode of offering by size of user in 1981. This exhibit shows that $14.5 million, almost 40% of all services offerings, will be spent for remote services by very

EXHIBIT VI-2

# COMPUTER SERVICES EXPENDITURES
# BY SIZE OF FIRM
# ($ MILLION)

| COMPANY SIZE | SERVICES EXPENDITURES ($ MILLION) | | AVERAGE ANNUAL GROWTH RATE |
|---|---|---|---|
| | 1976 | 1981 | |
| Very Large | $10 | $17 | 11% |
| Large | 3 | 7 | 18 |
| Medium | 4 | 9 | 18 |
| Small | 3 | 5 | 11 |
| TOTAL | $20 | $38 | 14% |

EXHIBIT VI-3

## DISTRIBUTION OF 1981 COMPUTER SERVICES EXPENDITURES

($ MILLION)

| MODE OF SERVICE | USER SIZE | | | | TOTAL |
|---|---|---|---|---|---|
| | VERY LARGE | LARGE | MEDIUM | SMALL | |
| Remote Services | $14.5 | $4.5 | $6 | $1 | $26 |
| Batch Processing | 0 | 1 | 1 | 2 | 4 |
| Facilities Management | 0 | 0 | 0 | 0 | 0 |
| Professional Services | .5 | .5 | 1 | 1 | 3 |
| Software Products | 2 | 1 | 1 | 1 | 5 |
| TOTAL | $17 | $7 | $9 | $5 | $38 |

large customers. The next largest market from this viewpoint is remote services for the medium-sized company, a $6 million market, or 16% of all offerings.

## B. COMPUTER SERVICES BUDGET SHARE WILL SHRINK

- The computer services industry will lose a share of the user's EDP budget between 1976 and 1981. The average firm's services budget will shrink from 3.6% of the user's EDP budget in 1976 to 2.9% in 1981. The primary reason for this will be the lack of offerings to appeal to the very large companies. (Exhibit 6.4 ) These companies are currently spending a large percentage of their EDP budget on services companies, because they want to catch up to the state of the EDP art or have yet to install in-house systems. As these companies pass a critical size, they will be large enough to fund in-house equivalents of the services company offering, or they will have caught-up. The loss of revenue from this sector will be partially offset by growth from 4% to 5% of EDP budget for medium ($30 to $300 million) companies. These companies will need the expertise of sophisticated computing to stay competitive, but with an average 1981 EDP budget of only $250,000 each, they will not be able to afford in-house expertise.

- Exhibit 6.5 shows the relationship between mode of services offering and application, either industry-specific or cross-industry. The major area of interest, almost 50% of the 1981 market, is industry-specific applications, primarily order entry, offered by remote services.

## EXHIBIT VI-4

## EXPENDITURES ON COMPUTER SERVICES AS PERCENTAGE OF TOTAL EDP EXPENDITURES

| COMPANY SIZE | % OF EDP BUDGET SPENT ON COMPUTER SERVICES | |
|---|---|---|
| | 1976 | 1981 |
| Very Large | 3% | 2% |
| Large | 4 | 4 |
| Medium | 4 | 5 |
| Small | 6 | 6 |
| TOTAL | 3.6% | 2.9% |

EXHIBIT VI-5

## FOOD INDUSTRY
## COMPUTER SERVICES APPLICATIONS BY MODE OF SERVICE AND APPLICATION
## (1981)

| COMPUTER SERVICES CATEGORY | EXPENDITURES ($ MILLION) | | TOTAL |
|---|---|---|---|
| | CROSS-INDUSTRY | INDUSTRY-SPECIFIC | |
| Remote Services | $ 8 | $18 | $26 |
| Batch Processing | 3 | 1 | 4 |
| Facilities Management | 0 | 0 | 0 |
| Professional Services | 2 | 1 | 3 |
| Software Products | 3 | 2 | 5 |
| TOTAL | $16 | $22 | $38 |

## 1. REMOTE BATCH

- The remote batch segment is and will continue to be the biggest offering of the remote services market, growing from \$8.5 million in 1976 to \$21 million in 1981, a 20% annual growth rate. The key to this growth will be large data networks for order entry applications in the larger firms. This application will account for 55% of the services expenditures of all food processors and a much higher percentage in the larger firms. Of the amount spent on order entry, about 70% will be on message switching and 30% on route accounting systems.

- The next largest remote batch offering, 20%-30% of the total remote batch market, will be general cross-industry problems such as payroll, A/R, etc., sold on an RJE or distributed processing basis. The majority of these sales will still be for divisions of large companies which will be playing catch-up with more advanced divisions of their own companies.

## 2. INTERACTIVE

- Interactive applications are relatively few and do not utilize much computer time. This market segment will remain relatively small, even though it will double from \$2 million in 1976 to \$4 million in 1981. The major offerings will be linear programming services for on-line data manipulation. The codes can also be run in batch mode by services companies, thus reducing the amount of expensive interactive time needed. Other interactive applications are corporate financial modeling, hedging operations, and engineering calculations.

### 3. DATA BASE

- Data base is a small opportunity, growing from virtually nothing in 1976 to $1 million in 1981. The primary applications for data base services will be hedging, with lesser requirements in monitoring and analyzing market share and econometric modeling. This market will be limited by the large applications development budgets that are needed by vendors to develop both data base and applications software.

### 4. BATCH PROCESSING

- Batch processing will remain static at $4 million from 1976 through 1981. Vendors in this market can expect rapid customer turnover, as old customers bring work in-house and new customers are added to fill the gap.

- The major application for this service mode will be basic standard cross-industry application for small customers. Vendors such as ADP with its payroll system and ITEL with its accounts receivable system will account for major portions of this market. These applications will account for $3 out of the $4 million spent in 1981.

### 5. SOFTWARE PRODUCTS

- Software products will grow from $3 million in 1976 to $5 million in 1981, an 11% annual growth rate.

- The majority of this $5 million will be for system packages used by the larger companies to support their installations. Business systems in

the small companies will also spend a lot on manufacturers' software, since software costs run 10% to 20% of hardware costs.

- Applications packages will be sold to smaller companies who cannot afford to develop their own packages. The major industry-specific software packages will be linear programming and order entry.

- Several of the respondents indicated that they were planning to redo their payroll/personnel systems because of new government regulations, particularly in accounting for pension and retirement funds. This proprietary package could have been sold to many of the interviewed manufacturers.

- Among some of the software packages that interviewees discussed having purchased were:
  - fixed asset evaluation
  - payroll tax
  - accounting systems, general ledger, accounts receivable, accounts payable
  - production forecasting
  - payroll/personnel
  - data base packages
  - SORT program
  - librarian

## 6. PROFESSIONAL SERVICES

- Professional services are relatively insignificant in the industry, growing from a current $2 million in 1976 to $3 million in 1981, an 8%

annual growth rate. The major areas for professional services are in installation assistance of small business computers for the smaller companies and warm body programming support for overload and peak period situations. These two services will account for 80% of professional services expenditures. There will be a smaller professional services opportunity in designing communications networks.

### 7. FACILITIES MANAGEMENT

- Facilities management is a negligible opportunity in the food services industry and is projected at zero. Among the fifty companies interviewed, there was not a single managed facility, nor did anyone know of one.

- At one time, Frito-Lay, a major division of Pepsico, had been a facilities management customer of Electronic Data Systems (EDS), but Pepsico wanted more control and the installation was brought in-house.

- In general, the nature of the food industry is incompatible with the facilities management concept, both from a cost and data security standpoint.

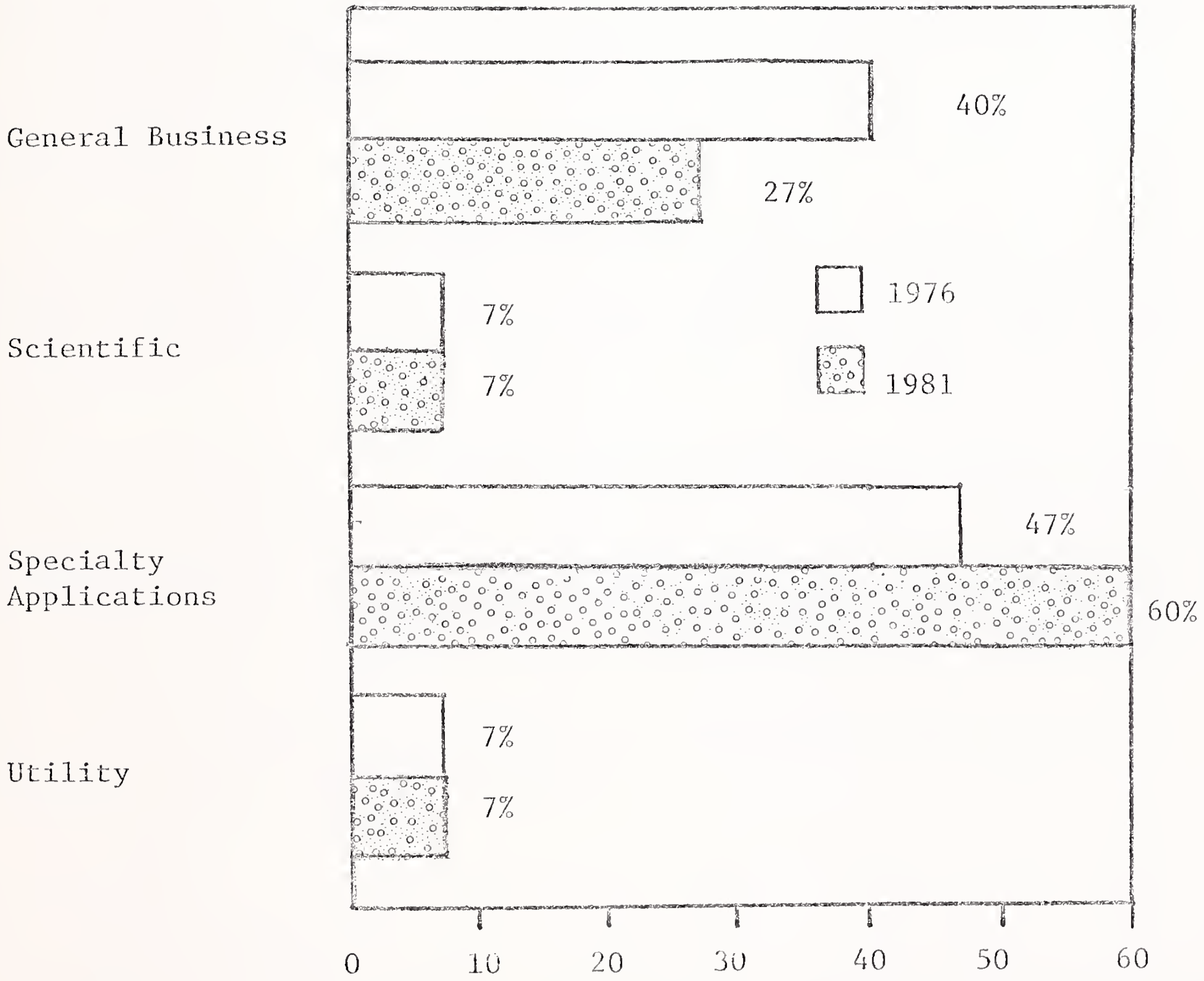
## C. PROCESSING SERVICES WILL DOUBLE IN THE NEXT FIVE YEARS

### 1. INTRODUCTION

- Exhibit 6.6 shows the relative market shares within the processing services market. Of various types of services, specialty applications is the leading share, followed by general business services.

EXHIBIT VI-6

## PROCESSING SERVICES BY TYPE OF SERVICE



% OF MARKET

## 2. SPECIALTY APPLICATIONS

- Specialty applications will lead the processing services market, growing from 47% of the market in 1976 to 60% in 1981, an $18 million opportunity. Exhibit 6.7 provides more detail of the $18 million specialty market. Remote order entry is the major specialty applications with 50% ($9 million) of the market. This is followed by route accounting at 22%, linear programming application (blending and optimization) at 17%, and hedging at 11%.

- Each of these specialty applications represents a method of market penetration for capturing not only specific applications but other areas as well.

- One of the reasons that order entry leads in revenues is that a large portion of the dollars will be dollars passed through communications network costs. Order entry can be captured by an existing services company with a network. Industry-specific knowledge will not be difficult to obtain. Some of the current market entrants are:

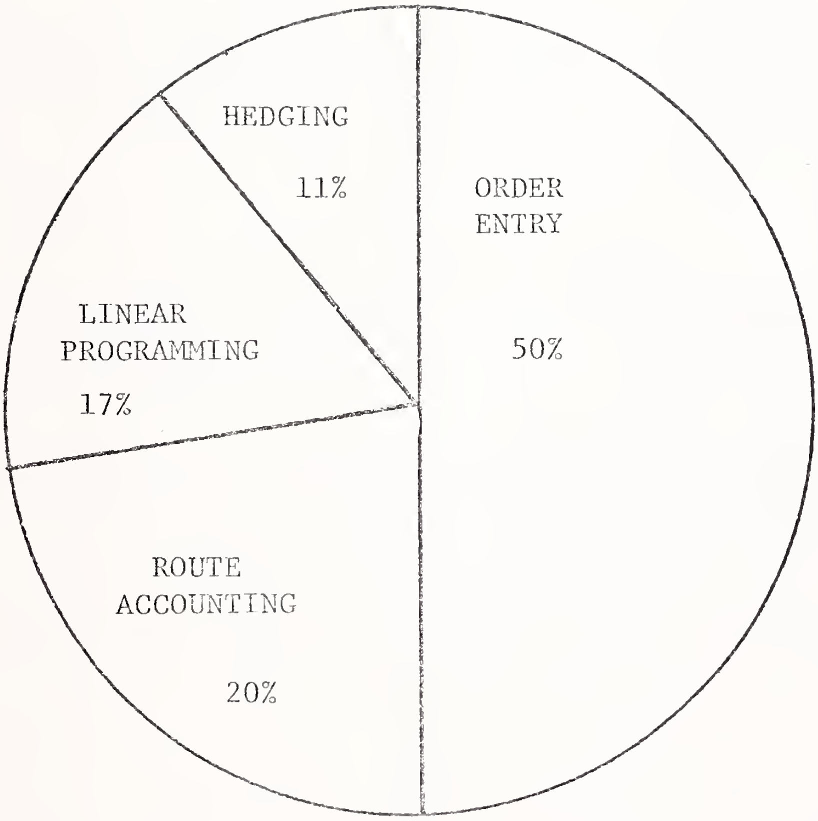
  - WILTEK
  - General Electric
  - Service Bureau
  - National CSS.

- Route accounting is the next major market segment, 22% of the specialty market and $4 million. This application will require industry-specific knowledge in order to tailor the application to a particular sector such as:

EXHIBIT VI-7

SPECIALTY APPLICATIONS

1981



$18 MILLION

- soft drinks
- other beverages
- bakery
- dairy

- The largest vendors currently in route accounting are Marchbank and Parker, an independent company with a beverage software package, and Cambell-Taggert, a bakery that provides a remote job entry service bureau for its competitors.

- A joint development effort with one of the food processors will be the best way of entering this market.

- Linear programming, the next largest market, a $3 million dollar opportunity, will take even more expertise than route accounting. It will require knowledge of the mathematical modeling technique as well as the customer. Because the customer will be relatively small, a great deal of hand holding will be required. The advantage of using this application as an entry point is the customer loyalty that will be generated as the vendor becomes familiar with intimate details of the customer's business.

- The linear programming market has been primarily served by smaller, boutique type firms such as Nelson Associates in Lafayette, Indiana; and Computone, a large Atlanta-based company which offers a 360/65 on-line service. Major companies such as General Electric or Service Bureau have made some market penetration, primarily because they have an LP code available on their network. They have made no special efforts to capture customers in this market.

- Hedging is currently a very small opportunity. It will take a great effort to develop the product and the market. There will be room for only one or two vendors.

## 3. GENERAL BUSINESS

- General business applications are the other major processing services opportunity. Their share of the food industry market will shrink from 40% to 27%, primarily because the market will grow faster than this segment, which will grow from $6 to $8 million.

- The majority of general business market applications will be in the very common applications of payroll, general ledger, accounts receivable, and accounts payable offered to the smaller companies on an RJE or batch basis.

## 4. UTILITY PROGRAMS

- Utility programs will remain relatively static, growing in volume from $1 to $2 million, while maintaining 7% of the processing services market. The major segment of this market will be manufacturers' unbundled software. Cross-industry utilities such as sorts, librarian, and performance monitoring systems will have the same appeal to food manufacturers as to any other manufacturers.

## 5. SCIENTIFIC

- Scientific applications will remain at 7% of the market throughout

the forecast period. The primary scientific applications will be in econometric modeling and engineering calculations. There are no applications in this area that can be justified for development as entry points to the food industry. Instead, these will be drag-along opportunities to be offered or developed with the specific applications.

## D. WHO USES COMPUTER SERVICES?

- All of the companies contacted either had centralized computing or a corporate level manager who was cognizant of the division's EDP efforts. Fewer than 10% of the contacted companies had decentralized computing, and in only one of these was the corporate manager not exerting control over the decentralized operations.

- In franchising/licensing arrangements such as the soft drink bottlers, the corporation has no control over its end distributors; however, the corporation can be used as a central point to gain contact with other distributors. Independent companies may range in size from several million dollars to a half billion dollars, and their needs will be different.

- Despite the centralization of EDP authority, few food processors produce long-range budgets or are geared to fund substantial development efforts. Therefore, any major selling efforts will require substantial support outside of EDP and among general corporate officers. EDP projects must be sold, and sold on tangibles.

- Many larger companies have been built by acquisition and do not have common systems and procedures throughout their divisions. It may therefore

be necessary to develop different applications for each division.

## E. WHY ARE COMPUTER SERVICES USED?

- There are two major reasons that food companies purchase outside services:
  - lack of expertise
  - turnaround time.
- A third, but minor, point is convenience.

### 1. LACK OF EXPERTISE

- Lack of expertise is the most common reason for purchasing. Either a company is too small to warrant the maintenance of its in-house staff, or its in-house system is too small to process the required programs.
- During the course of the interviews, the feeling of NIH (Not Invented Here) came through more strongly than with other industries. Companies think that they have more expertise or that their problems are so unique that an outside service would be of little help. The NIH problem diminishes with decreasing company size, because smaller companies recognize their lack of expertise.

### 2. TURNAROUND TIME

- Turnaround time is important for some as a reason, but this is often because of a lack of expertise. (As used here, the term stands for the global time of project implementation and development.)

- Software products or processing services purchases were made because the food processor wanted to get an application installed and working in a minimum amount of time and did not have in-house capability or adequate staff. An example is the Kane-Miller Corporation, a half-billion dollar operation that had negligible data processing installed three years ago. The corporation brought in a corporate director of MIS who gave a joint development contract to NCSS. Within twelve months it began to install EDP on a division by division basis.

- A few companies also noted that they procured professional software services because they needed warm bodies to finish a job, not because they needed expertise.

- Turnaround time is important in real time order entry applications, but this need is perceived as the requirement for a communications network rather than a fast turnaround for the application. The actual application turnaround time is overnight response.

## 3. CONVENIENCE

- Convenience was also recognized as a reason for buying services. It came into play, for example, when a local batch service bureau was hired to perform regular business applications. There was little inclination to shop for a specific service; the prevalent mode was to select a nearby and convenient vendor.

# VII. TECHNICAL AND MARKETING REQUIREMENTS

## VII TECHNICAL AND MARKETING REQUIREMENTS

### A. SUMMARY

- There are relatively few technical requirements for penetrating food processing beyond the technical requirements for the particular service/ product being offered. The most important factor in entering the market will be plain old-fashioned selling--finding the key person and selling him on specific programs and services.

- To sell to the food industry, it is necessary to think like a food manufacturer:

    - low costs
    - short lead times
    - high volatility of prices
    - short payout periods

- Grain and dairy co-ops represent a major sub-market, but penetration will be difficult because of their non-profit orientation. Sales approaches similar to those used with government or health care will have to be used.

- In many cases a major corporation such as Coca-Cola or Pepsico franchises hundreds of independent companies. A possible approach is to work with the franchisor to obtain credibility.

## B. DATA NETWORKS

- The major industry opportunity, order entry, will depend upon having and optimizing large data networks. The wide geographical distribution and relatively low data rates of the food processing applications makes network costs a major cost factor in systems development. Networks may be as unsophisticated as dial-in WATS or as sophisticated as packages piggybacked onto other services. Several manufacturers say that they suffered GIGO problems when they had salesmen/secretaries enter data, and so they reverted to a system in which orders were called in to central operators using CRTs.

- In most food situations, with a year's supply of inventory, out-of-stock conditions are rare, so interactive inventory applications are not required. Typically, network users polled sales offices one to five times per day and then fed picking slip information to warehouses overnight for next day delivery.

- Several companies with installed networks had no in-house technical capabilities but called in consultants when network changes or studies were required.

- Many companies are multi-national, and the availability of foreign networks is critical. Several companies responded that they had selected G.E. as a vendor for this reason.

- The Grocery Manufacturers Association, having designed the UPC (Universal Product Code) to identify all products, is now looking at the problem of having stores order directly from manufacturers. If this

should come to pass, the network requirements could become massive. There will be a need to collect the order messages from multiple stores and distribute them to each of the manufacturers.

## 1. EQUIPMENT - TERMINALS

- A major opportunity exists in developing an integrated system based on a network and a smart terminal. Food brokers and salesmen need a sophisticated editing device for their orders, while route accounting applications may need a small system to handle the full set of local processing applications. Among the interviewees, Datapoint, Data 100, and Sycor low cost systems were installed for these applications.

- The major requirement of these terminals is low cost. Storage medium is not critical, and cassette tapes may be used instead of disks for non-interactive applications. Although there is some usage of CRTs, there is no major inherent requirement for this feature.

- Good brokers and sales offices had TTY and similar levels of sophistication in installed equipment.

## 2. MATHEMATICS - LINEAR PROGRAMMING

- For applications offerings in the scientific field, an intimate knowledge of linear programming and similar modeling techniques is an absolute must. However, the success of the installation will not be based on mathematics, but instead on the front and back ends of the application, that is, its adaptation to the user. Users are unsophisticated,

and the complexities of the real world are obvious enough, so the vendor must adapt the technology to the user. Detailed industry know-how must be applied to modify output. Input must must be simplified. The horror story of the chickens that wouldn't eat the computer-blended feed is well known. Cows, on the other hand, will eat almost anything, and there is no problem with their feed.

- Users, especially the 24,000 small ones who spend less than $100,000/year on all EDP functions, will be called on to guide the user's continued growth in applications development.

- From the initial use and knowledge of LP codes, the user can be led to larger models and other areas of the company to expand usage.

## C. MARKETING STRATEGIES

- Most companies are highly centralized, and sales can be made from a single central point, However, major selling must be from the top down, starting with the CEO. Almost all DP managers interviewed were unanimous in their statements that they are underutilizing DP, but they were hamstrung by budget constraints or payout criteria from doing anything that would expand their empires. The manager definitely needs help in selling his management on new ideas.

- Trade associations, such as the Grocery Manufacturers Association, will provide seminar spots at their meetings for the vendor who has a meaningful message.

- Many companies have large networks of independent licensees or franchises.

These independent companies may not have a great deal in common other than their common products, however the sale of cross-industry products to them will greatly amplify the marketplace. These companies will be highly diverse, ranging from small family enterprises to large companies with revenues of hundreds of millions of dollars.

- Joint development efforts are a fruitful way to enter the market, especially for new vendors. This method was used by most of the current industry-specific vendors.

- Selling through food brokers may be another approach. Using the fact that a group of brokers have common product lines, an approach to food companies to install terminals at the brokers, could be very productive.

- There are specific opportunities outside of the EDP department. Corporate modeling and hedging applications are each separate purchase points within the corporation. The latter, in the buying department, is usually a completely independent operation.

- Other opportunities exist by working with existing market data gathering activities, such as A.C. Nielson. A common program can be developed for analyzing this data and meshing it with company data.

- Selling to cooperatives is a completely different ballgame. Most of these organizations are closely related to the commodity end of the business. They chose common problems, such as hedging, market contract analysis, and monitoring. The orientation of cooperatives is non-profit. This makes for a very difficult sale. The purchasing will often be done

by a committee, and it will be hard to find a single decision maker. Cooperatives can also provide entry to vertically-integrated services to farmers. Co-ops, because of their relationship to growers, are more prone to do hedging, and this could be a strong entry application.

- Besides industry specialities, the food industry has many of the same problems as other industries, and individual sales of products and services are made by direct selling to the individual in charge. For example, over 10% of the interviewees mentioned that they were using the asset valuation package of AVC (American Valuation Corporation), an application that is sold in the controller's office.

- Specific systems packages or common routines, such as ALTAX, will have to be sold directly to the DP manager.

## 1. INDUSTRY SPECIALIZATION

- Industry specialization is not nearly as important as applications specialization, and there the intimate knowledge of the customer's business is necessary to adapt the application to the customer. The food industry is not prone to common packages. Each company is too highly individualized and will require tailoring, even if the tailoring is more cosmetic than substantive in nature.

## 2. WHY DO THEY BUY A SERVICE?

- The major reasons for buying outside services ranked is descending order of importance are:

- lack of specific talents or products within the buyer's company
- lack of personnel, where warm body overload situations are required to finish a project on schedule
- size of company/application does not warrant in-house services.

- All interviewees commented that they were tending to bring more computer services such as Time Sharing and Service Bureau in-house, as they found the cost of outside services too expensive. Others reported that as they grew in sophistication, they were more prone to perform a make-or-buy decision on software, but that they could seldom find specific enough packages.

- Programmer overload and critical time periods were cited as reasons for purchasing programming help, but generally this was a low usage requirement, and no one mentioned it as a continual practice.

- Products and services will have to be sold to fill a need rather than be purchased by an in-house activity of the buyer.

## 3. HOW DO THEY CHOOSE A VENDOR?

- No specific rules could be identified on how vendors were selected. The responses were as varied as the questions. Most of the vendors seemed to be picked because of geographical closeness and because they were there when required.

- When successfully established, the buyer-vendor relationship remained in place, and price was not a major factor in displacing an in-place vendor. The new vendor must offer a new, needed service or product.

- One major contract, over a quarter million dollars a year, was let, because the vendor was willing to fund a joint development effort. The vendor in turn sold the package to other companies.

- There is little competitive evaluation in the industry. Once a vendor is tied to a customer, he can continue to exploit that relationship. There also appears to be little vendor loyalty, and many companies have multiple vendors. One company had 8-10 timesharing vendors, each vendor having found a particular geographic or corporate purchasing point and then having exploited that opportunity.

- Software packages tend to be compared on a feature basis, the buyer selecting those products that meet his requirements. Cost is definitely a secondary objective.

- One company made a major six-figure commitment to a software package, because it wanted to be on stream in a hurry. It expected substantial modifications over the next 2-3 years, but time was of the essence.

- Often commitments were made because of the availability of communications networks.

- Sloppy work, unqualified vendors, and generally unprofessional conduct are inimical to the growth of services. One vendor stated that he hired a consulting service to install a small business system. The company ended up with 95 programs and 118 data files.

## 4. COST-EFFECTIVENESS

- The food manufacturing industry, because of its low value-added and profit margin, is very cost-conscious. All applications must be rigorously cost justified, and intangible sales are nearly impossible.

- One company expected that the route accounting application they are installing will cut accounting costs from $670 to $350 per route per year. Regardless of the merit of the argument, it is a clear case of rigorous cost justification.

- Another company stated that the payback period of all new applications is one year; others stated that 2 to 3 years was usual.

- The industry does not have an R&D orientation and is not attuned to capitalizing software development costs. These costs must be written off.

# VIII. COMPETITIVE ENVIRONMENT

# VIII COMPETITIVE ENVIRONMENT

## A. INDUSTRY-SPECIFIC

- The current industry-specific competition is very limited and consists primarily of small entrepreneurially-oriented companies.

- Market size dictates that future industry-specific markets will be dominated by 6 to 10 companies, probably one or two specializing in each of the specific applications areas:
  - hedging/data base
  - order entry/message switching
  - route accounting
  - blending/modeling/linear programming.

- The entrepreneurial nature of current vendors limits their outlook, and they lack the resources necessary to penetrate and develop the market. They are primarily limited by their own internal considerations rather than by the market.

- The market could become quickly dominated by an aggressive large company applying marketing and development effort. The current vendors tend to do no marketing but instead rely on word-of-mouth advertising.

- Apparently, no major services companies have noticed this market or tried to target it as a specific market.

## B. IN-HOUSE COMPETITION

- The major competition will be from in-house sources. The industry has a definite tendency to secretiveness combined with a not-invented-here syndrome.

- Typically, 2-5% of the EDP budget is spent on outside services. Thus, the food manufacturer feels competent enough to perform 95-98% of his own EDP.

- All the interviewees who are using extensive outside services expect to be bringing these services inside as corporate EDP departments expand geographically to divisions that use services or upgrade systems in order to offer in-house timesharing. Vendors will have to work hard to keep revenues from customers from declining, primarily by offering new services or applications that cannot be done in-house.

- A more insidious form of competition may come from the in-house service bureau. In the few highly decentralized corporations, the corporate EDP center acts as a service bureau, selling its services to far-flung divisions. Many of these divisions are small and currently use local service bureaus or timesharing services in lieu of their own EDP departments. They will be replaced by corporate EDP departments.

- Cambell-Taggert, a major bakery in Dallas, has developed a route-accounting application for their diverse divisions that has been so well received that it is offered on an RJE basis to many competitors. Some customers have backed off from the Cambell-Taggert system, finding it too restrictive for their applications.

## C. COOPERATIVES

- Although the industry has many cooperatives, these organizations do their own data processing and do not offer services to outside members. They do offer some services on a vertical basis to their own members. They do not constitute a threat to entry by an outside vendor.

## D. SERVICES COMPANIES

- Existing major services companies, those with revenues in excess of $5 million, have not targeted the food industry as a market. They are, of course, well-represented by the general services that they offer. Food companies buy and vendors sell all the typical cross-industry packages and non-specific services. G.E. and SBC are heavy penetrators of the industry because of their ubiquity rather than because of any specific strategy.

- Major companies offering remote linear programming services have been selected for use by particular companies, but there appears to be no effort on the part of vendors to exploit this opportunity.

- Food processors use standard business packages to the same degree as other manufacturing companies, and there is no reason to expect that vendors won't exploit these opportunities.

- Bonner and More, an experience LP vendor to the petroleum industry, has made no penetration of the food industry.

- Many small local service bureaus offer standard accounting-type functions in their local areas. ITEL and Automatic Data were also found to be competing but only in their own cross-industry general-purpose applications.

## E. SMALL BUSINESS SYSTEMS VENDORS

- For food processors with less than $300 million revenues who will represent 37% of the computer services market in 1981, the major competition will be among vendors of small business systems. In general, this market will be the unsophisticated user who wants standard accounting-type applications, which the stand-alone small business system will adequately handle. In addition, the freestanding system can offer security and privacy.

- Over half of the services expenditures for users will be:
  - classic batch service bureau offerings
  - installation services for new systems
  - vendor supplied systems/applications software for small business systems.

- Typically, systems software runs 10-20% of the basic monthly charges for a small business system.

- Services vendors who offer industry-specific applications, such as route accounting, will have the advantage in attracting business. Another way to fight the small business system will be to offer an even smaller system (i.e., smart terminal) backed up with a remote services offering for larger jobs or data bases.

- Among the large and very large users, distributed processing will become prevalent, and the vendor who supplies the smart systems/terminals will become the tail wagging the dog.

## F. MAINFRAME MANUFACTURERS

- Mainframe manufacturers will be competitors in the sense that their standard applications and systems packages will account for $5 million and 13% of the market. (See Exhibit 8.1 ) It is not expected that mainframe companies will make any specific push into the industry.

- The amount of penetration will vary with company size. For very large companies, mainframe vendors will capture 12% of the market, $2 million. (Exhibit 8.2 ) This share will increase to 20% for small companies as mainframe vendors supply more applications packages as well as systems software.

## G. INDUSTRY-SPECIALIZED VENDORS

- Among the industry-specialized vendors that were mentioned in the survey are:

- Snyder Associates, Lafayette, Indiana, is a small firm that is an outgrowth of Purdue University and specializes in feed blending and sausage blending.

- Computone, Atlanta, is a medium-sized firm specializing in remote linear programming applications offered on an IBM 360/65.

- Thomas Company, New York, is small local batch services company that has gained much commodity expertise.

- Marchbank and Parker, San Antonio, Texas, is a small firm specializing in route accounting applications. The company concentrates primarily on

EXHIBIT VIII-1

## COMPUTER SERVICES MARKET
## BY VENDOR TYPE AND TYPE OF SERVICE
## 1981
## ($ MILLION)

| TYPE OF SERVICE | CAPTIVE HARDWARE VENDOR | SMALL SPECIALIST | GENERAL SERVICES COMPANY | TOTAL |
|---|---|---|---|---|
| General Business | $1 | $2 | $ 8 | $11 |
| Scientific | - | 1 | 1 | 2 |
| Specialty | - | 7 | 13 | 20 |
| Utility | 4 | - | 1 | 5 |
| TOTAL | $5 | $10 | $23 | $38 |

EXHIBIT VIII-2

## COMPUTER SERVICES MARKET

## BY USER SIZE AND VENDOR TYPE

1981

($ MILLION)

| TYPE OF SERVICE | CAPTIVE HARDWARE VENDOR | SMALL SPECIALIST | GENERAL SERVICES COMPANY | TOTAL |
|---|---|---|---|---|
| Very Large | $2 | $ 3 | $12 | $17 |
| Large | 1 | 2 | 4 | 7 |
| Medium | 1 | 3 | 5 | 9 |
| Small | 1 | 2 | 2 | 5 |
| TOTAL | $5 | $10 | $23 | $38 |

selling software packages but will be offering remote batch services.

- A.C. Nielson offers a data base on supermarket sales.

- AVD (American Valuation Corporation), Chicago, is a company that specializes in asset appraisal and also offers a software package for fixed-asset accounts. Over 15% of the surveyed firms had the package installed and called it the best by far.

- G.E's timesharing was used by several companies because of its international communications network.

- SBC was mentioned quite frequently in proportion to its market share. No special properties were attributed to SBC, only its existence and blanket coverage.

- National Computer Systems (NCSS), Stamford, Connecticut, was mentioned because of its national network and willingness to work with customers on joint development efforts.

- Wiltek, Norwalk, Connecticut, was mentioned because it supplied the terminals and communications network for a polled order entry system.

# APPENDIX A. DATA BASE

INPUT

## FORECAST USER EXPENDITURES FOR COMPUTER SERVICES

## BY MODE OF SERVICE

## INDUSTRY CATEGORY: FOOD MANUFACTURING (SIC 20)

| MODE OF SERVICE | EXPENDITURE ($ MILLION) | | | | | AVERAGE ANNUAL GROWTH RATE |
|---|---|---|---|---|---|---|
| | 1976 | 1977 | GROWTH RATE | 1979 | 1981 | |
| Remote Computing Services | $11 | $12 | 9% | $18 | $26 | 19% |
| Batch Processing Services | 4 | 4 | 0 | 4 | 4 | 0 |
| Facilities Management | 0 | 0 | 0 | 0 | 0 | 0 |
| Professional Services | 2 | 2 | 0 | 3 | 3 | 8 |
| Software Products | 3 | 3 | 0 | 8 | 5 | 11 |
| TOTAL | $20 | $21 | 5% | $33 | $38 | 14% |

## FORECAST USER EXPENDITURES FOR PROCESSING SERVICES

## BY TYPE OF SERVICE

## INDUSTRY CATEGORY: FOOD MANUFACTURING (SIC 20)

| PROCESSING SERVICES | EXPENDITURES ($ MILLION) 1976 | 1981 | AVERAGE ANNUAL GROWTH RATE |
|---|---|---|---|
| General Business | $ 6 | $ 8 | 6% |
| Scientific | 1 | 2 | 15 |
| Speciality Applications | | | |
| Order Entry/ Message Switching | 4 | 9 | 19 |
| Route Accounting | 2 | 4 | 15 |
| Hedging - Data Base | .25 | 2 | 150 |
| Linear Programing Base | 1 | 3 | 25 |
| SUB TOTAL | 7 | 18 | 21 |
| Utility | 1 | 2 | 15 |
| TOTAL | $15 | $30 | 15% |

### DISTRIBUTION OF USER EXPENDITURES FOR PROCESSING SERVICES IN 1976

### BY MODE AND TYPE OF SERVICE

### INDUSTRY CATEGORY: FOOD MANUFACTURING (SIC 20)

($ MILLION)

| TYPE OF SERVICE | MODE OF SERVICE | | | | | TOTAL |
|---|---|---|---|---|---|---|
| | Inter-active | Remote Batch | Data Base | Batch | FM | |
| General Business | .5 | 2.5 | 0 | 3 | 0 | 6 |
| Scientific | .5 | .5 | 0 | 0 | 0 | 1 |
| Specialty | | | | | | |
| Business | 1.0 | 4.0 | .5 | .5 | 0 | 6 |
| Scientific | 0 | 1.0 | 0 | 0 | 0 | 1 |
| SUB TOTAL | 1.0 | 5.0 | .5 | .5 | 0 | 7 |
| Utility | | | | | | |
| Business | 0 | .5 | 0 | .5 | 0 | 1 |
| Scientific | 0 | 0 | 0 | 0 | 0 | 0 |
| SUB TOTAL | 0 | .5 | 0 | .5 | 0 | 1 |
| TOTAL | $2.0 | $8.5 | $ .5 | $4.0 | $ 0 | $15 |

FORECAST USER EXPENDITURES FOR COMPUTER SERVICES

BY SIZE OF USER

INDUSTRY CATEGORY: FOOD MANUFACTURING (SIC 20)

| SIZE OF USER | EXPENDITURE ($ MILLION) | | | | AVERAGE ANNUAL GROWTH RATE |
|---|---|---|---|---|---|
| | 1976 | 1977 | 1979 | 1981 | |
| Very Large | $10 | $11 | $15 | $17 | 11% |
| Large | 3 | 3 | 6 | 7 | 18 |
| Medium | 4 | 4 | 7 | 9 | 18 |
| Small | 3 | 3 | 5 | 5 | 11 |
| TOTAL | $20 | $21 | $33 | $38 | 14% |

## DETAILED ANALYSIS OF SERVICES USAGE

## IN 1981

| COMPANY SIZE | AVERAGE SALES ($ MILLION) | NUMBER OF FIRMS | AVERAGE ANNUAL EDP EXPENDITURES ($ THOUSAND) | AVERAGE SERVICES REVENUES ($ THOUSAND) |
|---|---|---|---|---|
| Very Large | $2,800 | 50 | $17,000 | $340 |
| Large | 640 | 55 | 3,200 | 130 |
| Medium | 64 | 700 | 250 | 13 |
| Small | 4 | 22,000 | 4 | .2 |

# APPENDIX B. DEFINITIONS

INPUT

## DEFINITIONS

- **Computer Services**. These are services provided by vendors which perform data processing functions using vendor computers, or assist users to perform such functions on their own computers.

- The following are the definitions of the modes of service used in this report.

  - Remote Computing Services (RCS). Provision of data processing to a user by means of terminals at the user's site(s) connected by a data communications network to the vendor's central computer. The three sub-modes of RCS are:

    - Interactive (timesharing) - characterized by interaction of the user with the system, primarily for problem solving timesharing, but also for data entry and transaction processing. The user is "on-line" to the program/files.

    - Remote Batch - the user hands over control of a job to the vendor's computer which schedules job execution according to priorities and resource requirements.

    - Data Base - characterized by the retrieval of information from a vendor-maintained data base. This may be owned by the vendor or a third party.

  - Batch Services. This includes data processing performed at vendors' sites of user programs and/or data which are physically transported (as opposed to electronically by telecommunications media) to and/or

from those sites. Data entry and data output services, such as keypunching and COM processing are also included. Batch services include those expenditures by users which take their data to a vendor site which has a terminal connected to a remote computer used for the actual processing.

- Facilities Management (FM) (also referred to as "Reserve Management" or "System Management"). The management of all or a part of a user's data processing functions under a long-term contract (not less than one year). To qualify as FM, the contractor must directly plan and control, as well as operate, the facility provided to the user on-site, through communications lines or in mixed mode. Simply providing resources, even though under a long-term contract and/or for all of a user's processing needs, does not necessarily qualify as FM.

- Professional Services. Management consulting related to EDP, systems consulting, systems design and programming, and other professional services are included in this category. Services can be provided on a basis of: "Time and materials," whereby the user pays for the time used of an individual on a daily or other fixed rate, or "fixed price," where the user pays a fixed fee for a specific task or series of tasks.

- Software Products. This category is for users' purchases of systems and applications packages for use on in-house computer systems. The figures quoted include lease and purchase expenditures, as well as fees for work performed by the vendor to implement the package at the users' sites. Fees for work performed by organizations other than the package vendor are counted in professional services. The two subcategories are:

- Systems Packages - operating system, utilities, and language routines that enable the computer/communications system to perform basic functions. This software is provided by the mainframe manufacturers with their hardware; other vendors provide improved versions of this and special-purpose routines. This classification includes compilers, data base management software, communications packages, simulators, performance measurement software, diagnostic software, and sorts.
- Applications Packages - software which perform processing to serve user functions. They consist of general purpose packages, such as a payroll, accounting and inventory controls, and special purpose packages such as personal trust, airline scheduling, and demand deposit accounting.

- Processing Services - encompasses FM, RCS, and Batch Services. They are categorized by type of service, as distinguished from mode of service, bought by users as follows:

  - General Business Services - processing services for applications which are common to users across industry categories. Software is provided by the vendor. This can be a complete package, such as a payroll package, or an application "tool," such as a budgeting model, where a user provides much of the customizing of the finished product it uses. General business processing is often repetitive and transaction-oriented.
  - Scientific Applications Services - the processing of scientific and engineering problems for users across industries. The problems usually involve the solution of mathematical equations. Processing

is generally problem solving and is non-repetitive, except in the sense that the same packages or "tools" are used to address different, but similar, problems.

- Specialty Applications Services - provide processing for particular functions or problems unique to an industry or industry group. The software is provided by the vendor either as a complete package or an an application "tool" which the user employs to produce its unique solution. Specialty applications can be either business or scientific in orientation. Data base services where the vendor supplies the data base and controls access to it (although it may be owned by a third party) are also included under this category. Examples of specialty applications are: seismic data processing, numerically-controlled machine tool software control development, and demand deposit accounting.
- Utility Services - those where the vendor provides access to a computer and/or communications network with basic software that enables any user to develop its own problem solution or processing system. These basic tools include terminal handling software, sorts, language compilers, data base management systems, information retrieval software, scientific library routines, and other systems software.

- All expenditures and revenues addressed are "available" in that they are open for competition. "Captive" figures, which refer to expenditures by a user for services from a subsidiary company, such as Boeing Aircraft with Boeing Computer Services (BCS), are not included. They may be referred to when examining our individual "spinoff" vendor, such as BCS.

- When any questions arise as to the place to properly count certain user expenditures, INPUT addresses the questions from the user's viewpoint and categorizes the expenditures according to the answer to the question, "What does the user perceive he is buying?"

# APPENDIX C. USER QUESTIONNAIRE

INPUT

CONFIDENTIAL

**INPUT QUESTIONNAIRE**

CATALOG. NO.
SIC. CODE
SIZE CODE
AREA CODE
STUDY CODE
DATE
MM DD YY

STUDY TITLE:
TYPE OF INTERVIEW:

INTERVIEWER:

COMPANY:

CO. TYPE:

ADDRESS:

SALES:

# EMPL:

**INDUSTRY**

☐ DISCRETE MANUFACTURING
☐ PROCESS MANUFACTURING
☐ TRANSPORTATION
☐ MEDICAL
☐ SERVICES

☐ UTILITIES
☐ RETAIL
☐ BANKING
☐ WHOLESALE
☐ OTHER

☐ INSURANCE
☐ GOVERNMENT – FEDERAL
☐ GOVERNMENT – STATE & LOCAL
☐ EDUCATION

**INTERVIEWS**

| NAME | TITLE | TELEPHONE NO. |
|---|---|---|
| | | |
| | | |
| | | |

**SUMMARY**

**REFERENCES**

CONFIDENTIAL

INPUT QUESTIONNAIRE

## MARKET ANALYSIS PROGRAM - SERVICES INDUSTRY

## USER'S QUESTIONNAIRE

---

1. How do you see your company growth 1975 - 1976 - 1977 - 1981?

2. Is this the same for your industry overall?

3. Compared to your expected revenue growth, will your expenditures for EDP (check one):

_____a. Increase faster What rate? __________

_____b. Increase at the same rate

_____c. Increase at a slower rate What rate? __________

4. What concerns do you have about EDP use?

5. What EDP changes have you made in the past year?

6. What EDP changes do you expect to make in this year and next?

7. What EDP changes do you expect to make by 1980?

8. Is your EDP activity centralized, or decentralized?

9. What are your computer systems?

| | MAINFRAME | OP. SYS. | DB LANG? | ON-LINE SYST? |
|---|---|---|---|---|
| NOW | | | | |
| FUTURE | | | | |

10. a. How much is your internal EDP Budget, and how will that change in 1977, and by 1981 (if respondent declines to give dollars, ask for % of annual revenues).

| | 1976 | 1977 | 1981 | REASONS FOR CHANGE |
|---|---|---|---|---|
| BUDGET ($ or %) | | | | |

b. How is that budget to be allocated among people, hardware, and other data center costs?

| | 1976 | 1977 | 1981 | REASONS FOR CHANGE |
|---|---|---|---|---|
| PEOPLE (# or %) | | | | |
| HARDWARE | | | | |
| OTHER CENTER COSTS | | | | |

11. How much is being spent monthly (on the average) by your entire company for outside computer services?

Total $______________per month

or

__________% of total EDP budget

13. Of those applications which are processed outside your company,

a. Which are considered primary, and which secondary?
b. What mode of processing is used?
c. What vendor is used?
d. Are you satisfied with the vendor's service?

| FUNCTIONAL AREA | APPLICATION | | MODE & VENDOR | | | SATISFIED? |
|---|---|---|---|---|---|---|
| | PRIMARY | SECONDARY | Batch | RB | Inter. | |
| | | | | | | |

14. Why do you use (RCS/FM/BATCH/, etc....whichever is appropriate)??

15. In order of priority, what will be the new applications you will develop, or require?

1.

2.

3.

4.

5.

16. Do you have the resources to do all these?

17. Which ones could be done outside (development or processing)?

18. What services might you consider using, if whatever you wanted were available?

19. What services would you like to have offered to you now?

20. Are there any applications which you would not consider doing outside? If so, which, and why not?

21. Have you considered/would you consider facilities management?

22. What is your opinion of doing EDP work in-house, versus using outside services?

23. What developments might increase/decrease your use of computer services?

24. When you do use an outside service, who usually chooses the vendor?

25. Please rank these characteristics in choosing a vendor (1 = unimportant; 5 = very important):

a. Geographic location of vendor ________

b. Vendor's technical expertise in your field ________

c. Vendors hardware/software (explain) ________

d. Availability of a netowrk, natl, or intl. ________

e. Price ________

f. Other______________________________ ________

26. Under what conditions might you change vendors?

27. All other things being equal, how much of a price reduction would you require, to change vendors?

28. How do your vendors presently establish their billings to you (Transaction pricing? Fixed minimum plus monthly variable? CPU, connect, storage costs?)

29. How much support (sales, installation, conversion) did you require from your vendor(s) at the time of installation?

30. How much do you require now?

31. Do you have any technical requirements upon your vendors?

    a. Computer hardware?

    b. Software?

    c. Network?

    d. Languages used?

    e. Terminals offered?

    f. Communications speeds?

32. Have you considered, or will you consider using minicomputers instead of computer services?

33. Would you rate on a scale of 1 to 10 (1 = unsatisfactory, 5 = average, and 10 = outstanding), the computer services vendors you now use, plus any others with which you are familiar?

| VENDOR | RATING | COMMENTS |
|---|---|---|

34. Why did you choose the vendors you are now using?

35. Do you have any advice or suggestions you would like to offer to vendors of computer services?

Interviewer notes